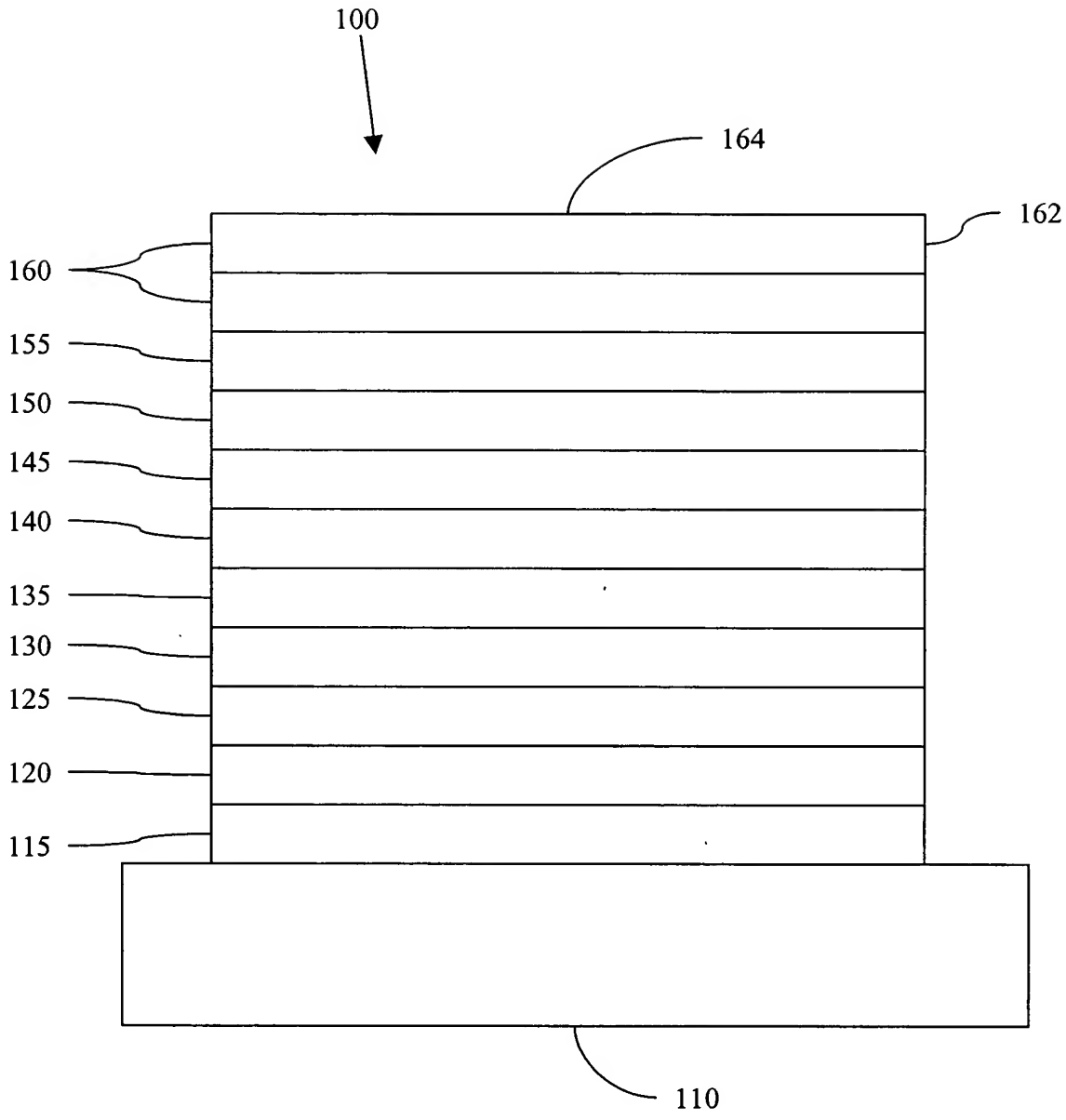


Figure 1

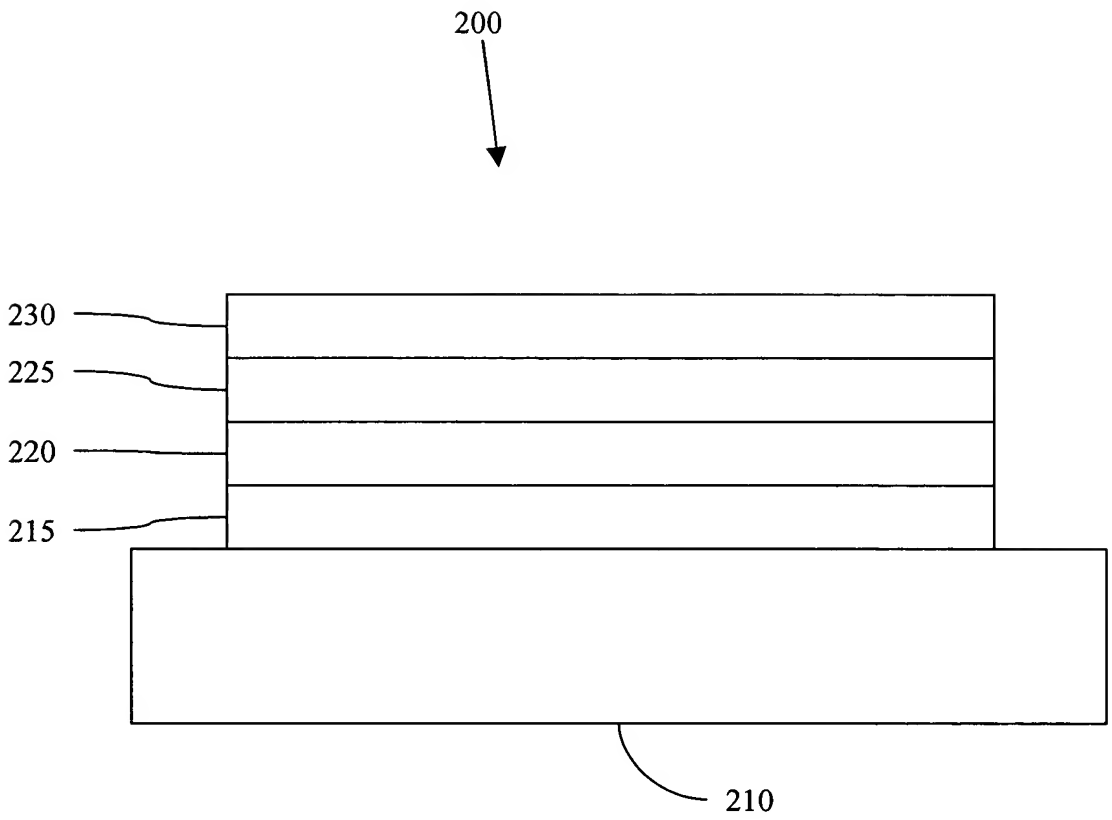


Figure 2

Figure 3

Electrochemistry: 5,5'-Spirobi(dibenzosilole)

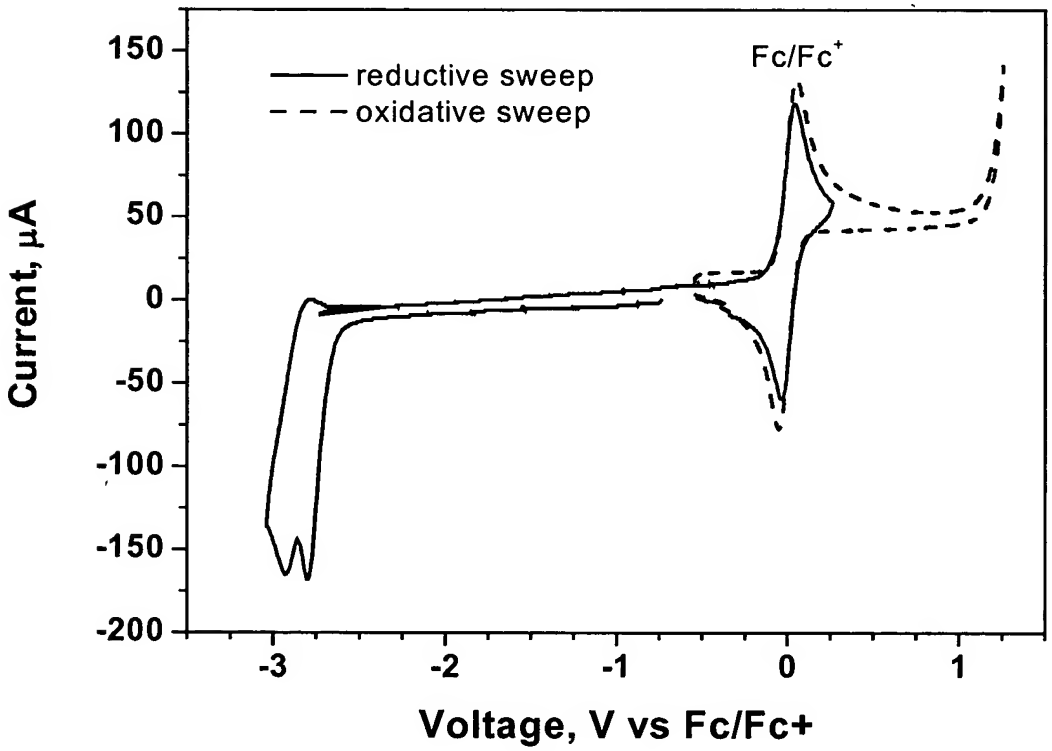


Figure 4

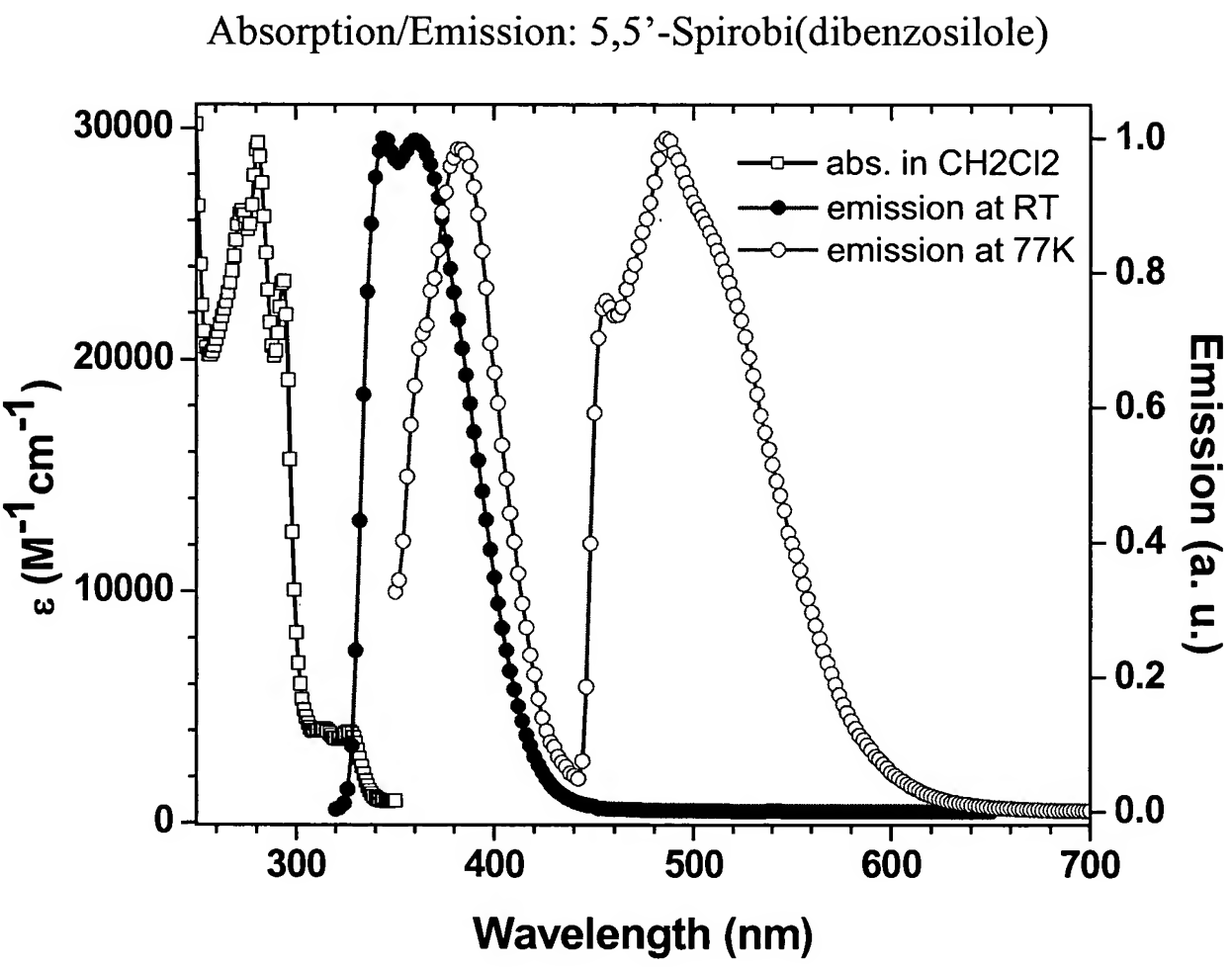

Absorption/Emission: 5,5'-Spirobi(dibenzosilole)
abs. in CH2Cl2
emission at RT
emission at 77K
ε (M-1cm-1)
Emission (a. u.)
Wavelength (nm)
30000
20000
10000
0
1.0
0.8
0.6
0.4
0.2
0.0
300
400
500
600
700

Figure 5

Device structure:
ITO/NPD(400Å)/Host:Irppy(300Å, 8%)/BCP(150Å)/Alq(150Å)/LiF/Al

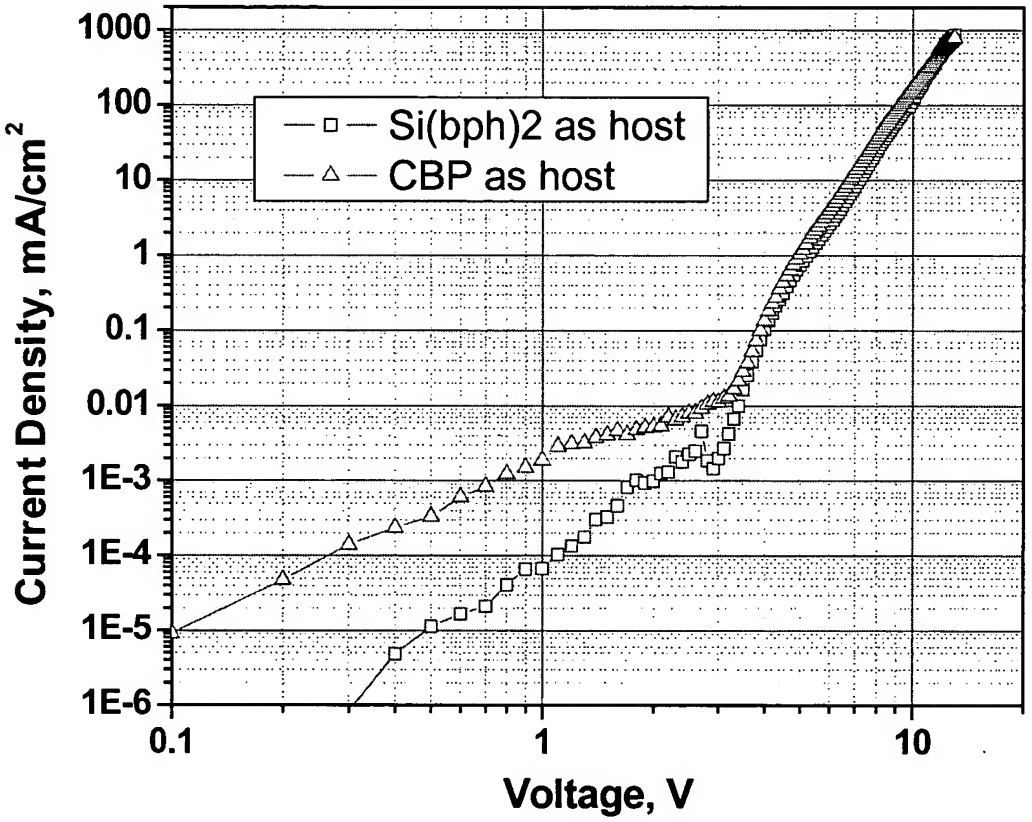


Figure 6

Device structure:
ITO/NPD(400Å)/Host:Irppy(300Å, 8%)/BCP(150Å)/Alq(150Å)/LiF/Al

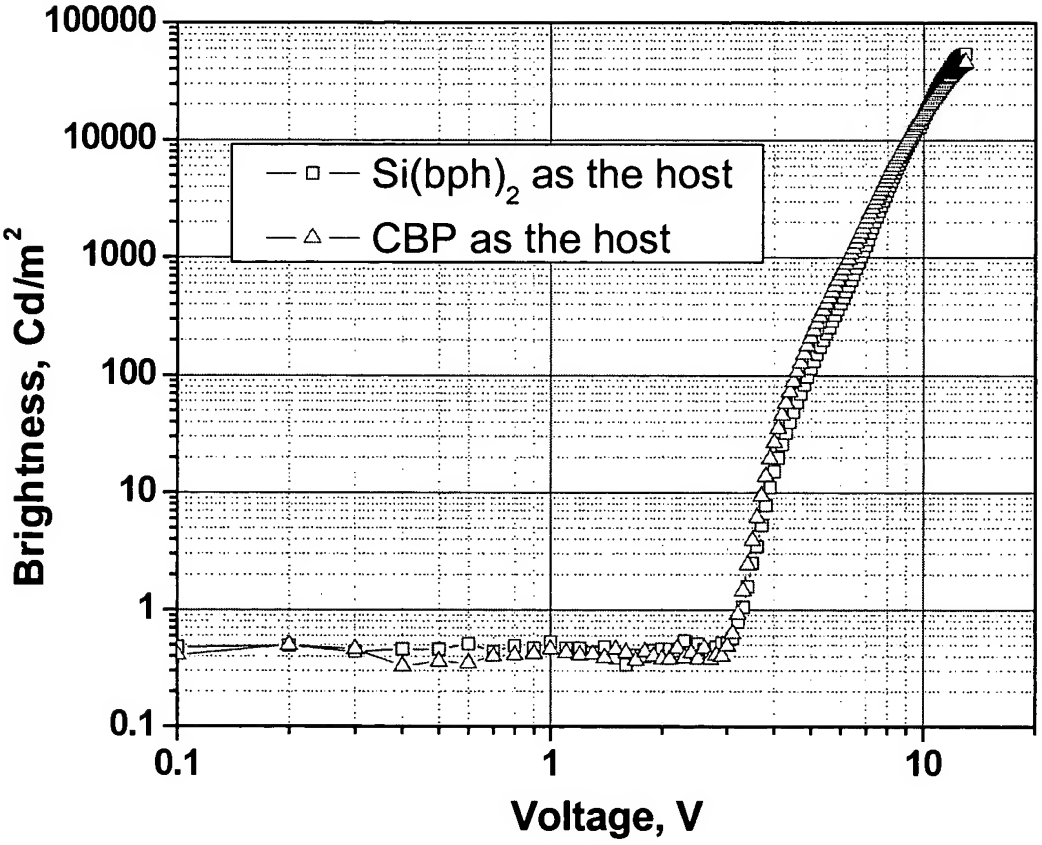


Figure 7

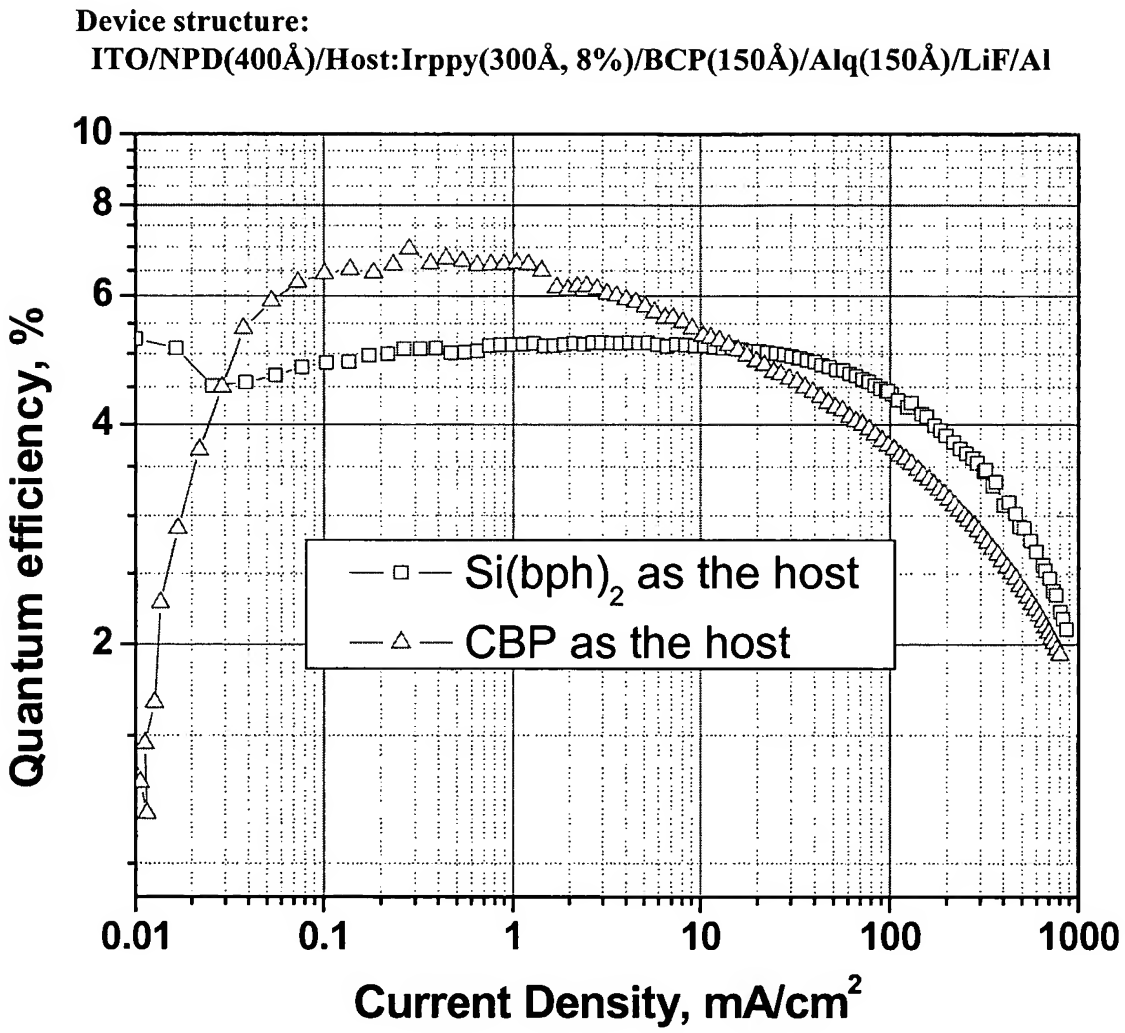

Device structure:
ITO/NPD(400Å)/Host:Irppy(300Å, 8%)/BCP(150Å)/Alq(150Å)/LiF/Al
Quantum efficiency, %
Current Density, mA/cm2
Si(bph)2 as the host
CBP as the host
10
8
6
4
2
0.01
0.1
1
10
100
1000

Figure 8

Absorption/Emission: Diphenyldi(*o*-tolyl)silane

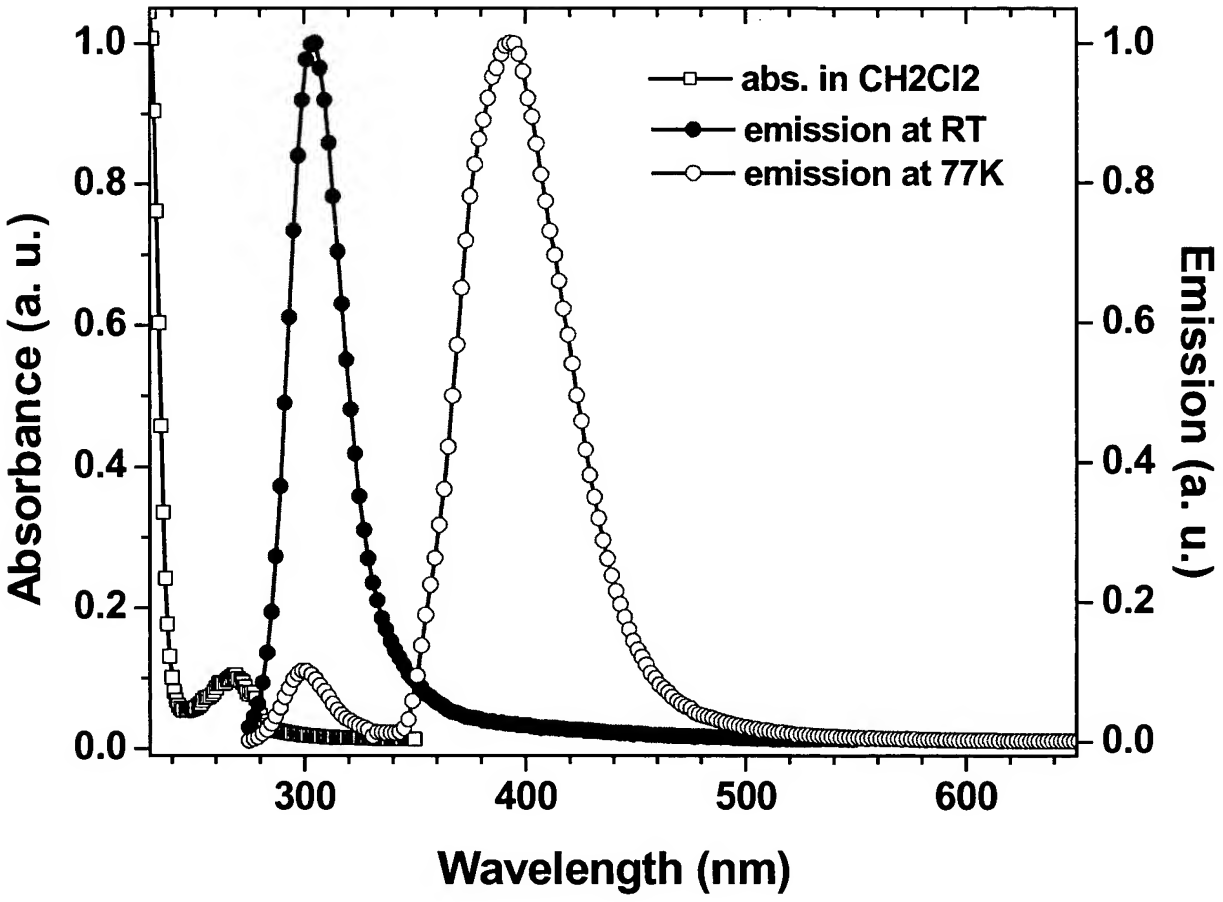


Figure 9

Device Structure:
ITO/NPD(400Å)/Irppy:host(8%, 300Å)/BCP(150Å)/Alq(250Å)/LiF/Al

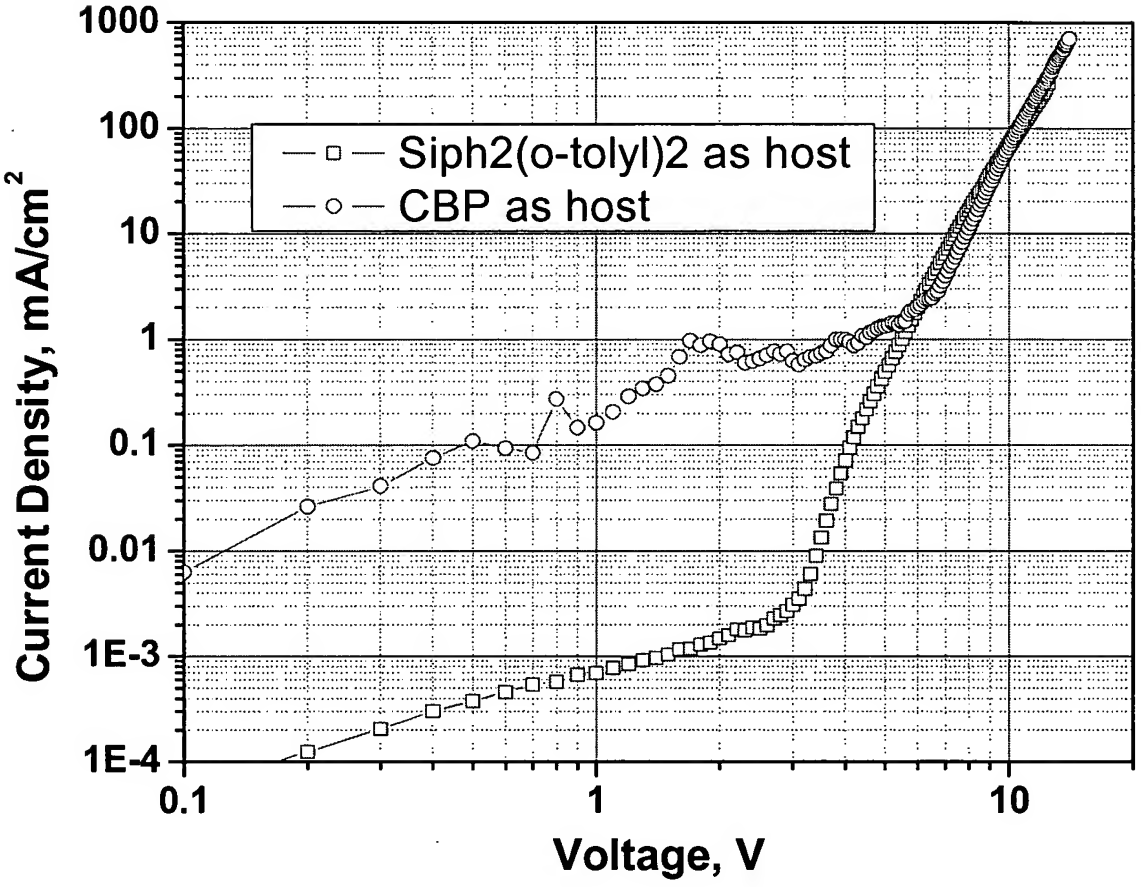


Figure 10

Device Structure:
ITO/NPD(400Å)/Irppy:host(8%, 300Å)/BCP(150Å)/Alq(250Å)/LiF/Al

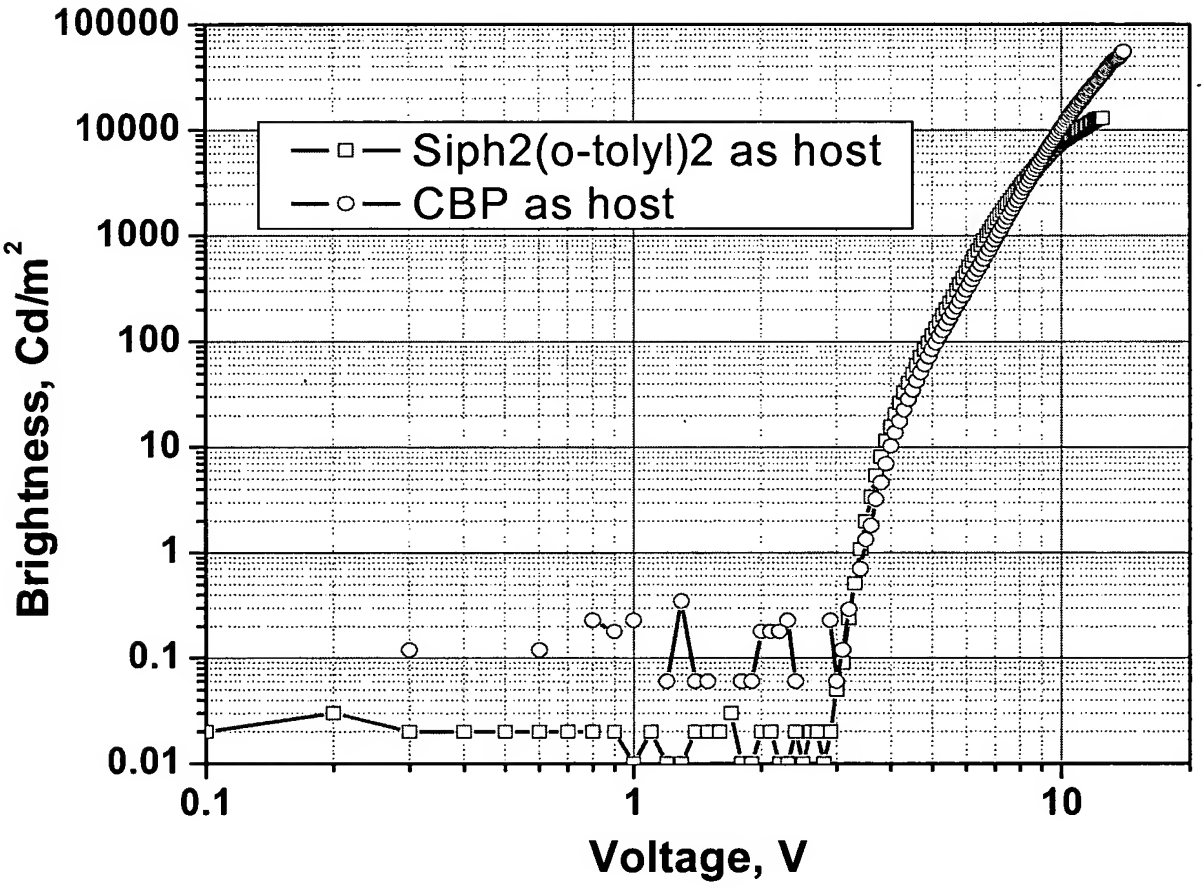


Figure 11

Device Structure:
ITO/NPD(400Å)/Irppy:host(8%, 300Å)/BCP(150Å)/Alq(250Å)/LiF/Al

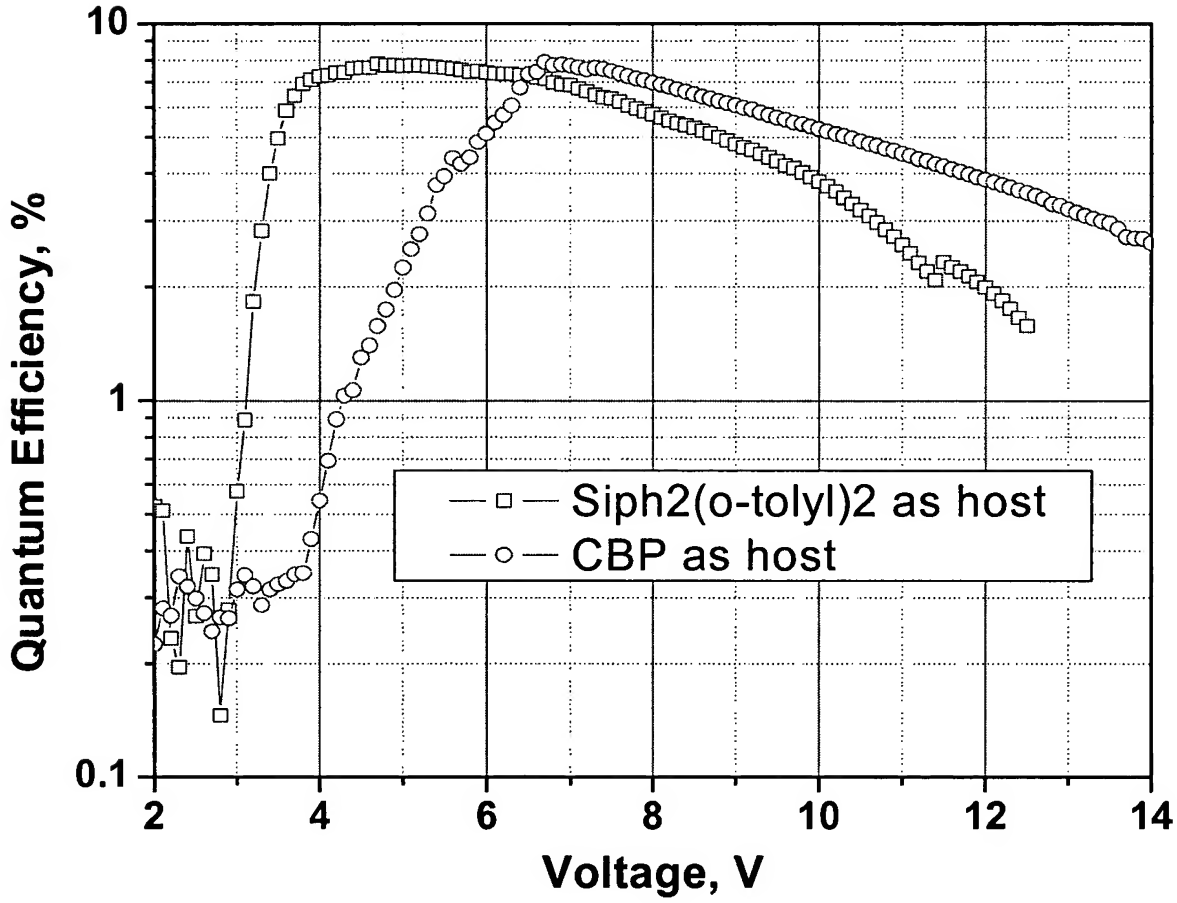


Figure 12

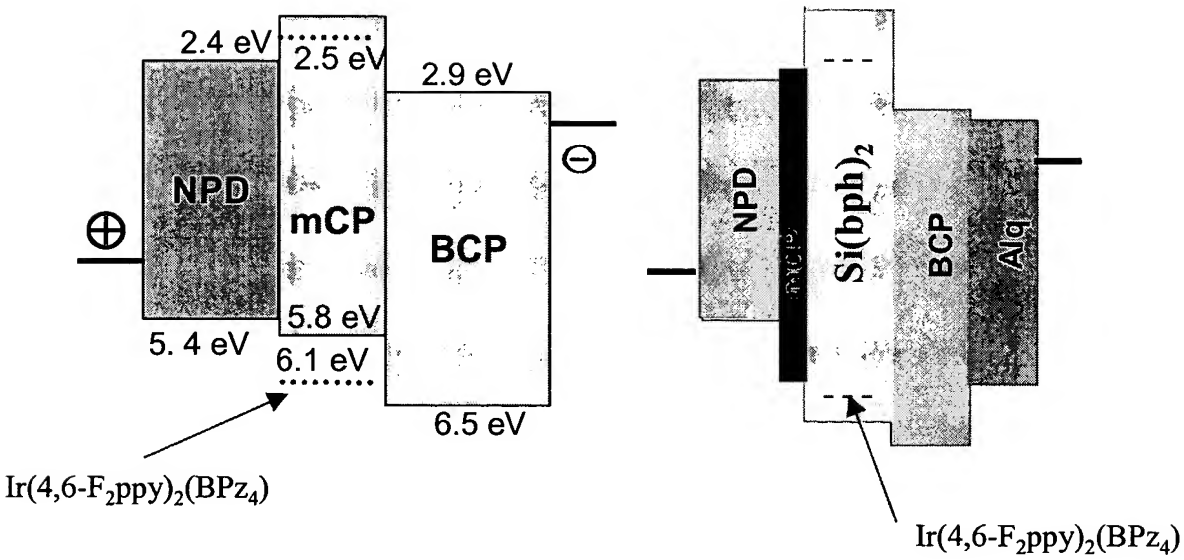

2.4 eV
2.5 eV
2.9 eV
NPD
mCP
BCP
5.8 eV
5. 4 eV
6.1 eV
6.5 eV
Ir(4,6-F2ppy)2(BPz4)
NPD
Si(bph)2
BCP
Alq
Ir(4,6-F2ppy)2(BPz4)

Figure 13

Device Structure:
ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz_4):host(8-9%, 250Å)/
BCP(150Å)/Alq(250Å)/LiF/Al

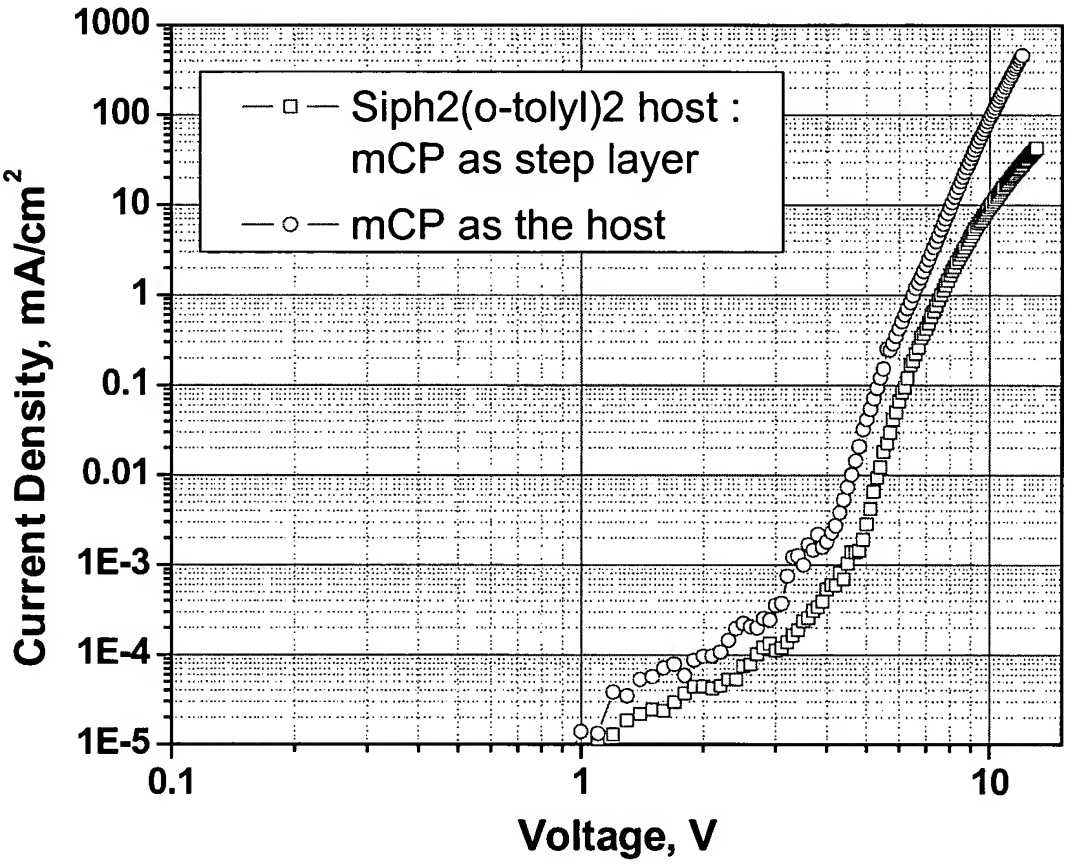


Figure 14

Device Structure:
ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz$_4$):host(8-9%, 250Å)/
BCP(150Å)/Alq(250Å)/LiF/Al

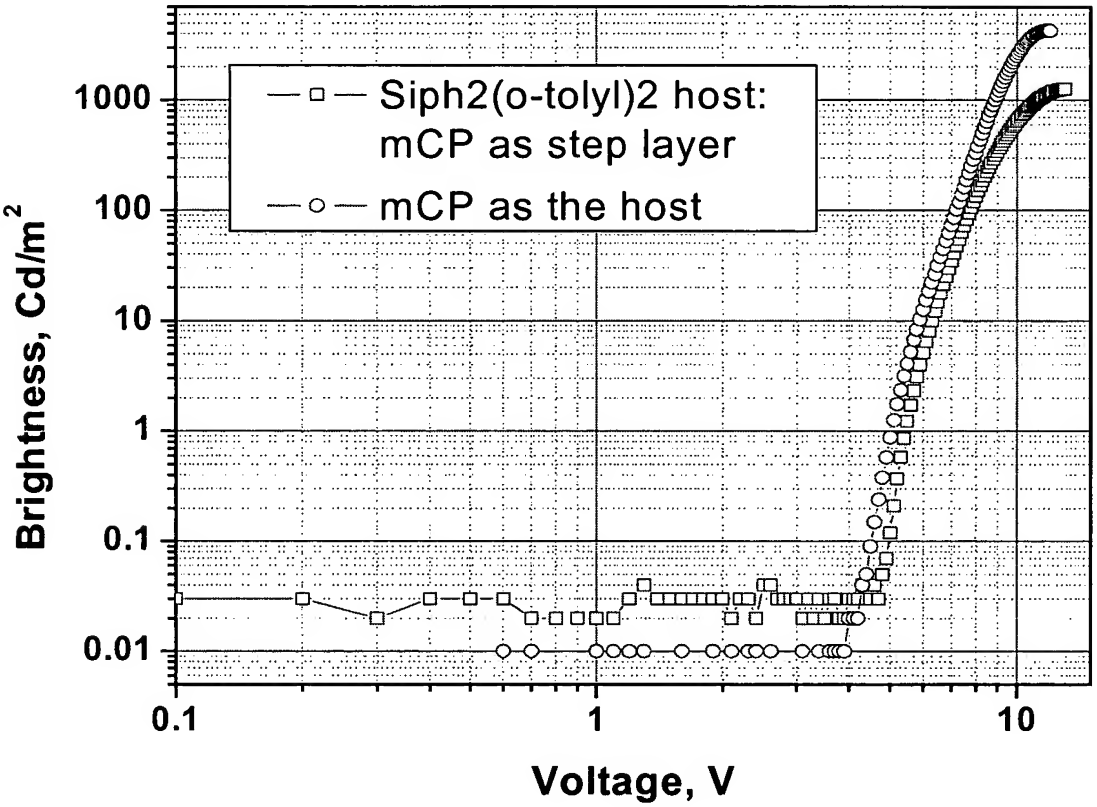


Figure 15

Device Structure:
ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz_4):host(8-9%, 250Å)/
BCP(150Å)/Alq(250Å)/LiF/Al

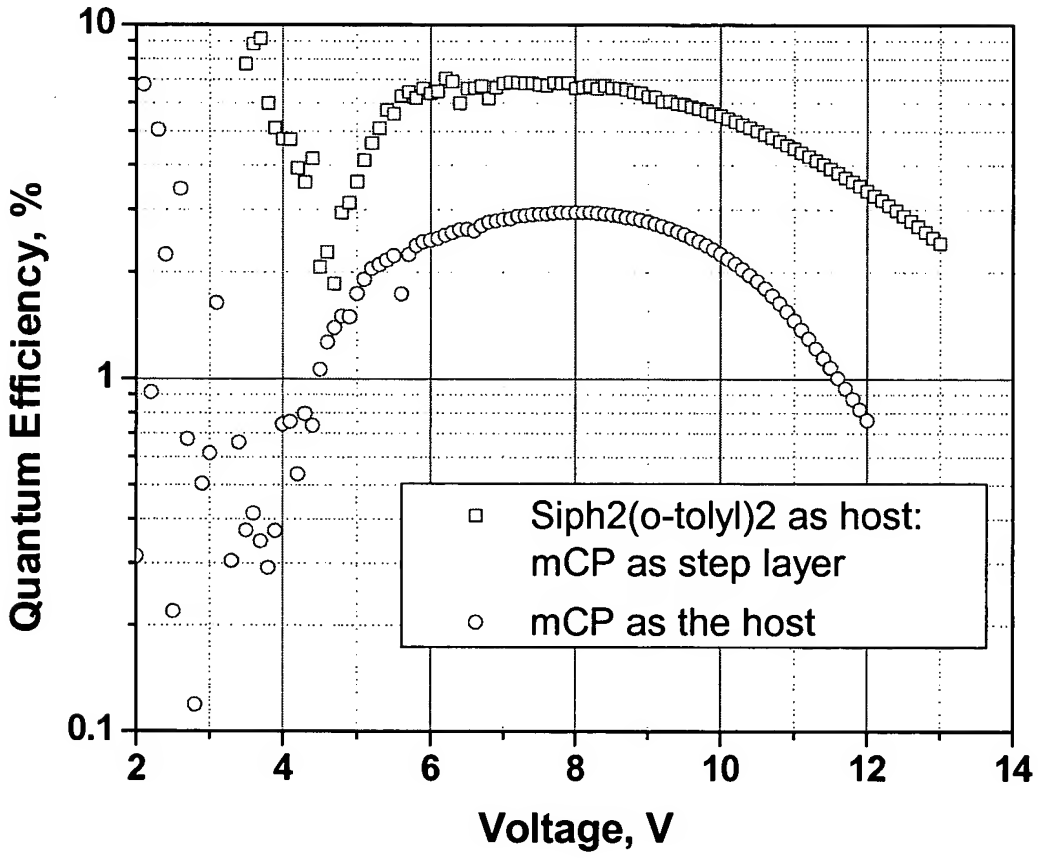


Figure 16

ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz$_4$): Si(bph)$_2$(250Å)/
BCP(150Å)/Alq(250Å)/LiF/Al

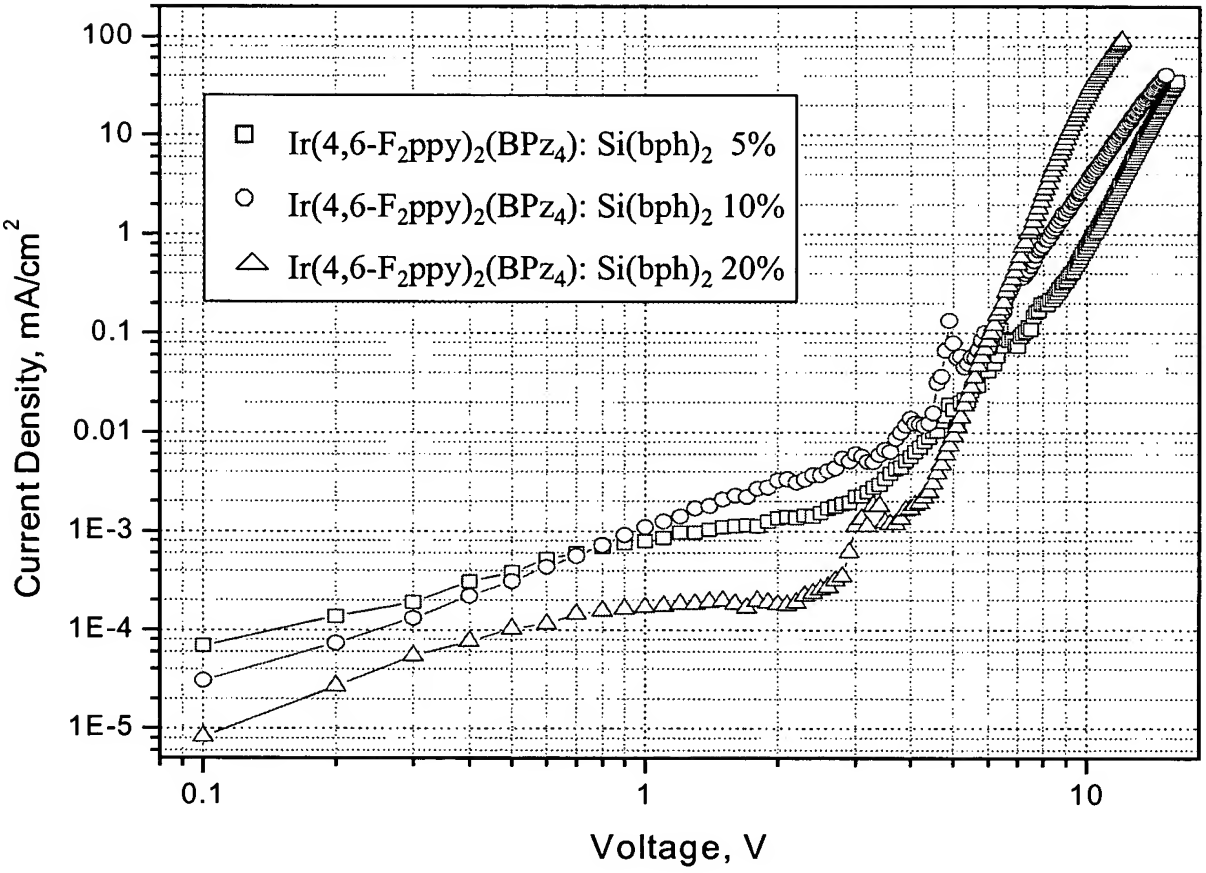


Figure 17

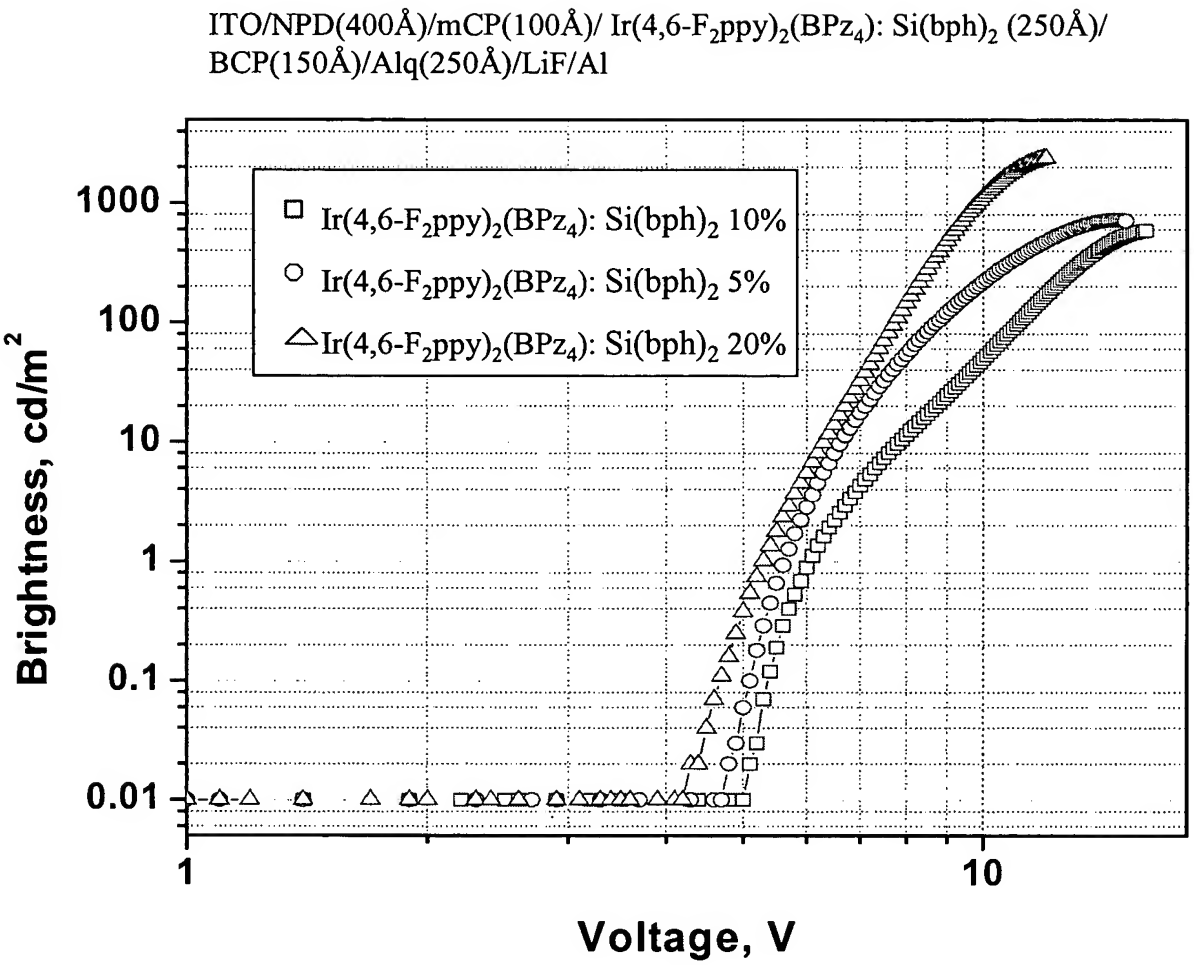

ITO/NPD(400Å)/mCP(100Å)/ Ir(4,6-F2ppy)2(BPz4): Si(bph)2 (250Å)/ BCP(150Å)/Alq(250Å)/LiF/Al
Ir(4,6-F2ppy)2(BPz4): Si(bph)2 10%
Ir(4,6-F2ppy)2(BPz4): Si(bph)2 5%
Ir(4,6-F2ppy)2(BPz4): Si(bph)2 20%
Brightness, cd/m2
1000
100
10
1
0.1
0.01
1
10
Voltage, V

Figure 18

ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(Bpz$_4$): Si(bph)$_2$ (250Å)/ BCP(150Å)/Alq(250Å)/LiF/Al

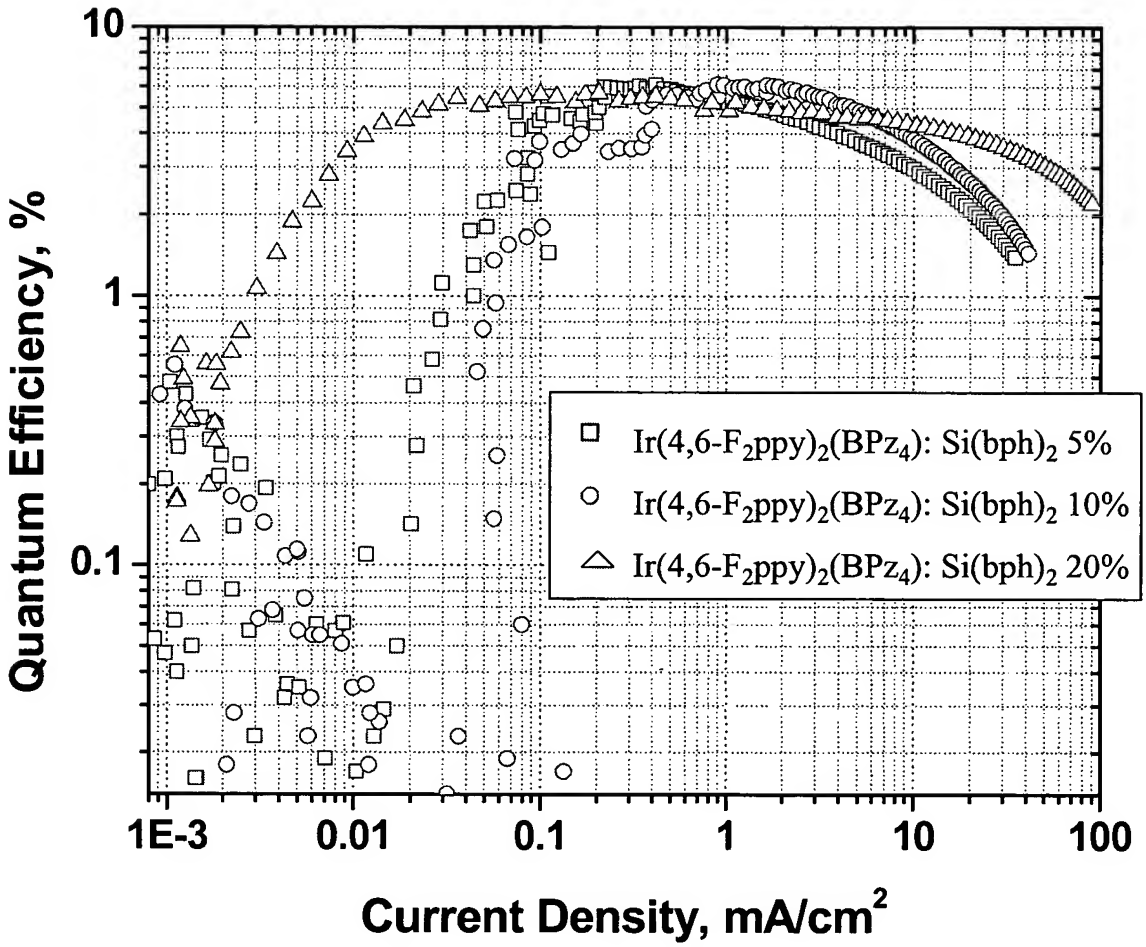


Figure 19

ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz$_4$): Si(bph)$_2$(250Å)/
BCP(150Å)/Alq(250Å)/LiF/Al

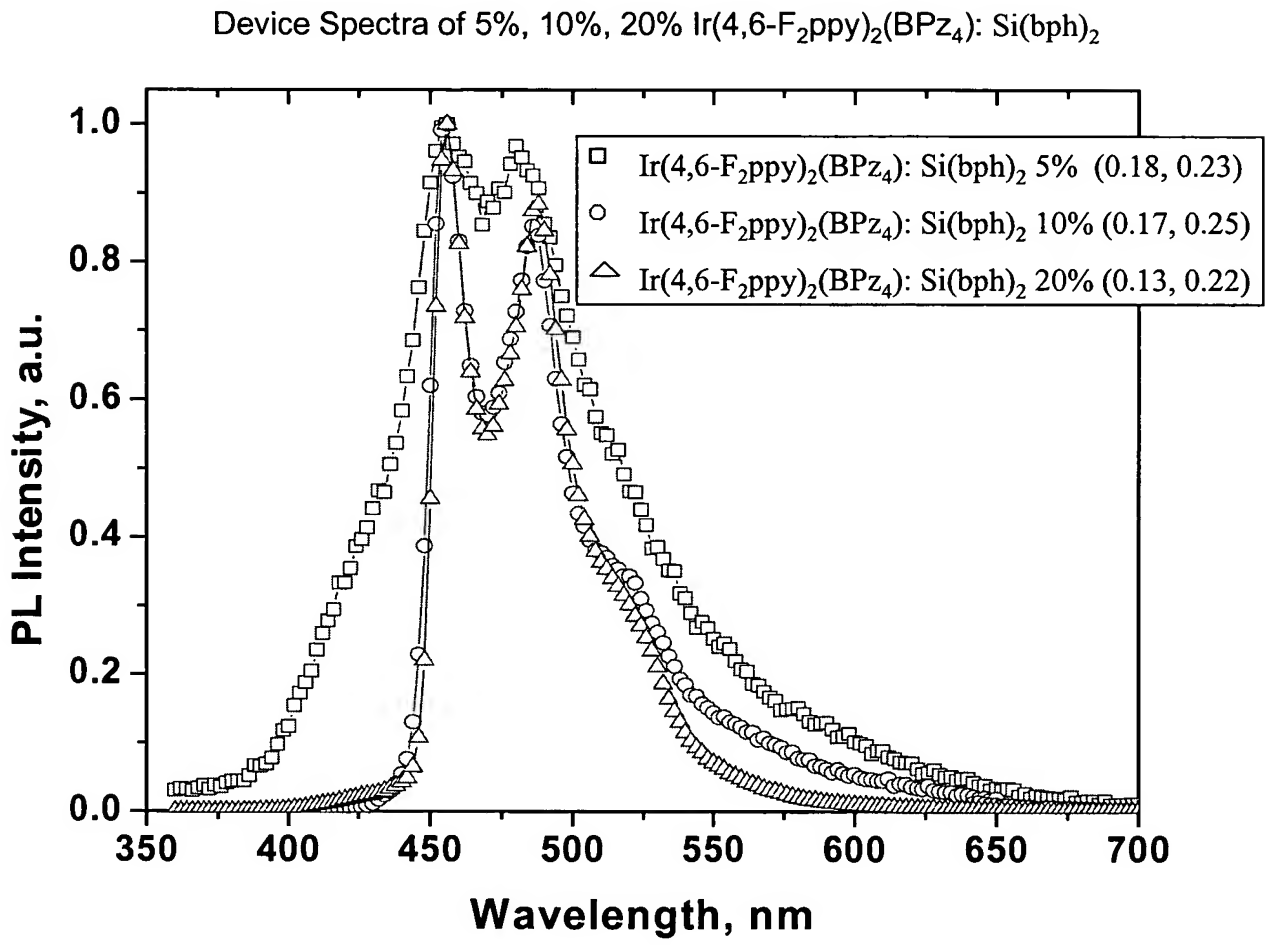


Figure 20

Devices:
ITO/NPD(400Å)/FIrpic: $Si(bph)_2$ (300Å)/BCP(150Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/mCP/ FIrpic:$Si(bph)_2$(300Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/FIrpic:mCP(300Å)/Alq(250Å)/LiF/Al

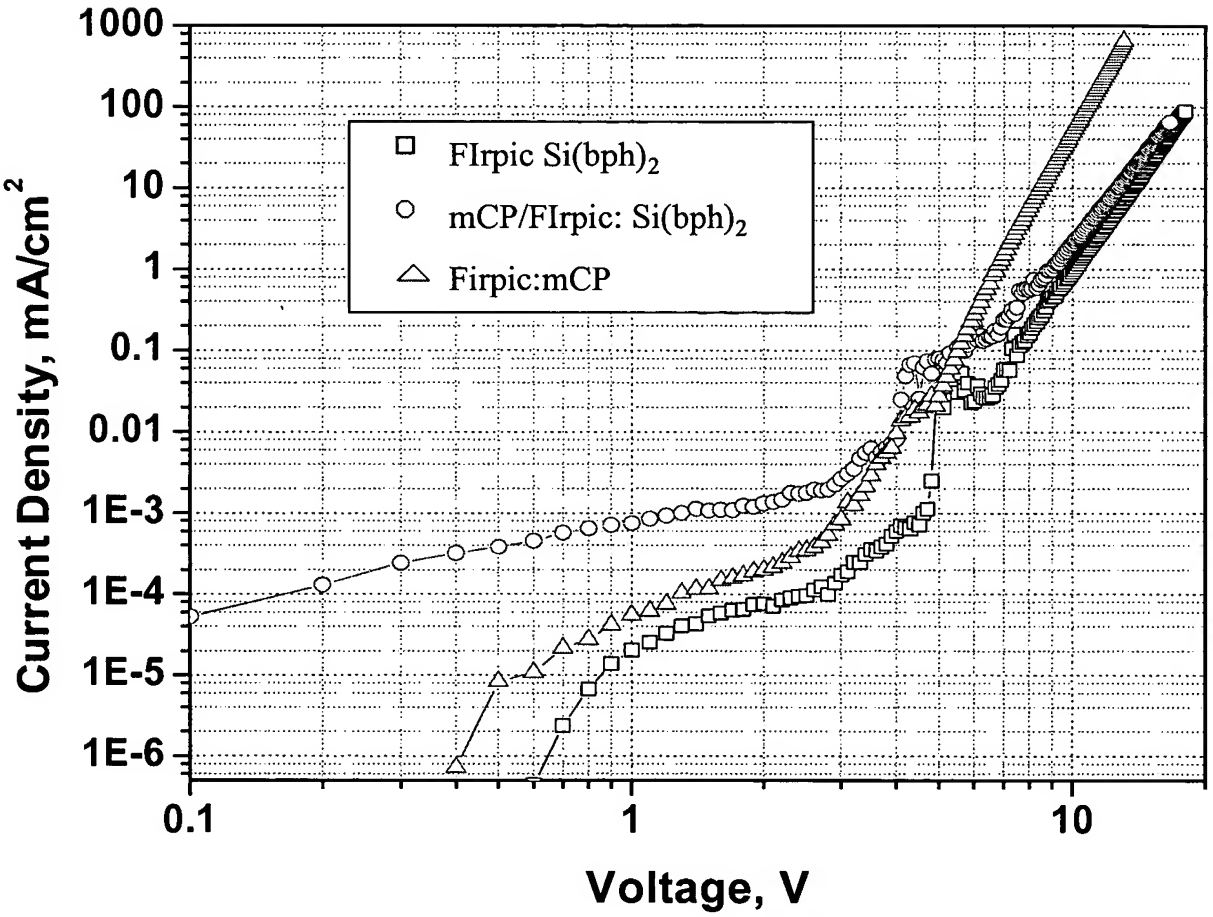


Figure 21

Devices:
ITO/NPD(400Å)/FIrpic:Si(bph)$_2$(300Å)/BCP(150Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/mCP/ FIrpic:Si(bph)$_2$(300Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/FIrpic:mCP(300Å)/Alq(250Å)/LiF/Al

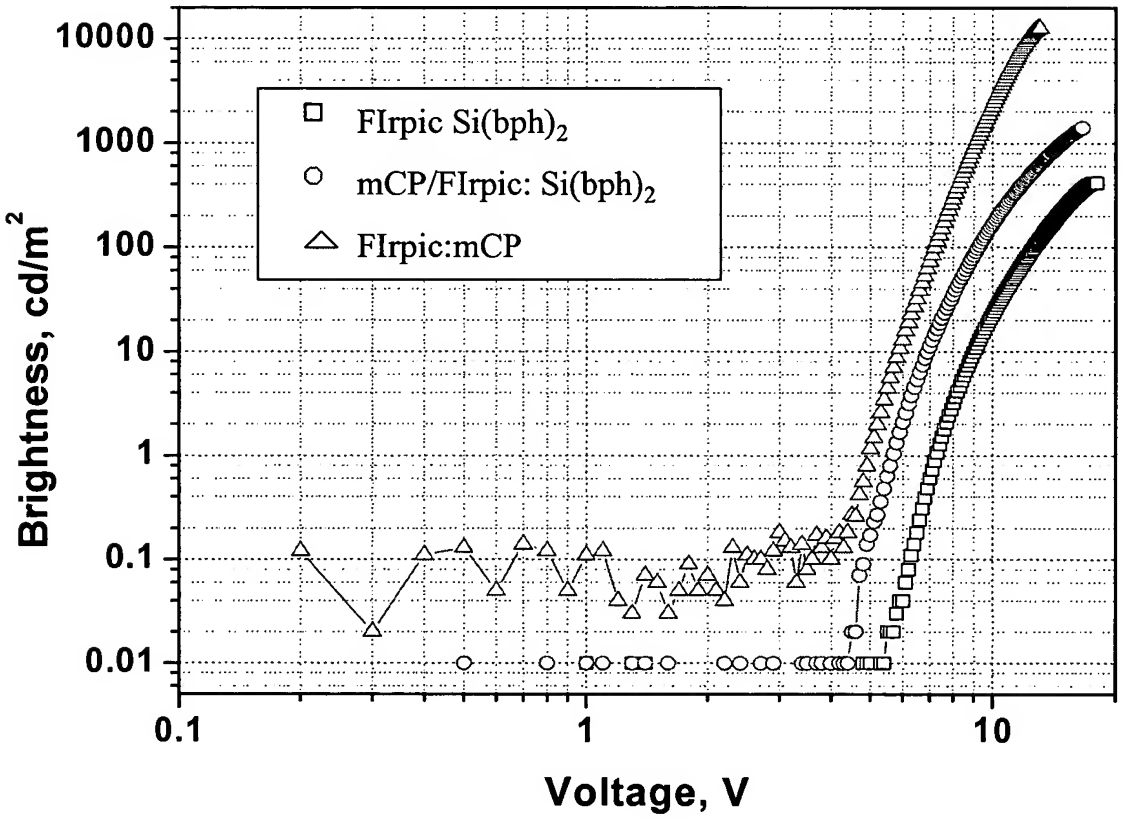


Figure 22

Devices:
ITO/NPD(400Å)/FIrpic:Si(bph)$_2$(300Å)/BCP(150Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/mCP/ FIrpic:Si(bph)$_2$(300Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/FIrpic:mCP(300Å)/Alq(250Å)/LiF/Al

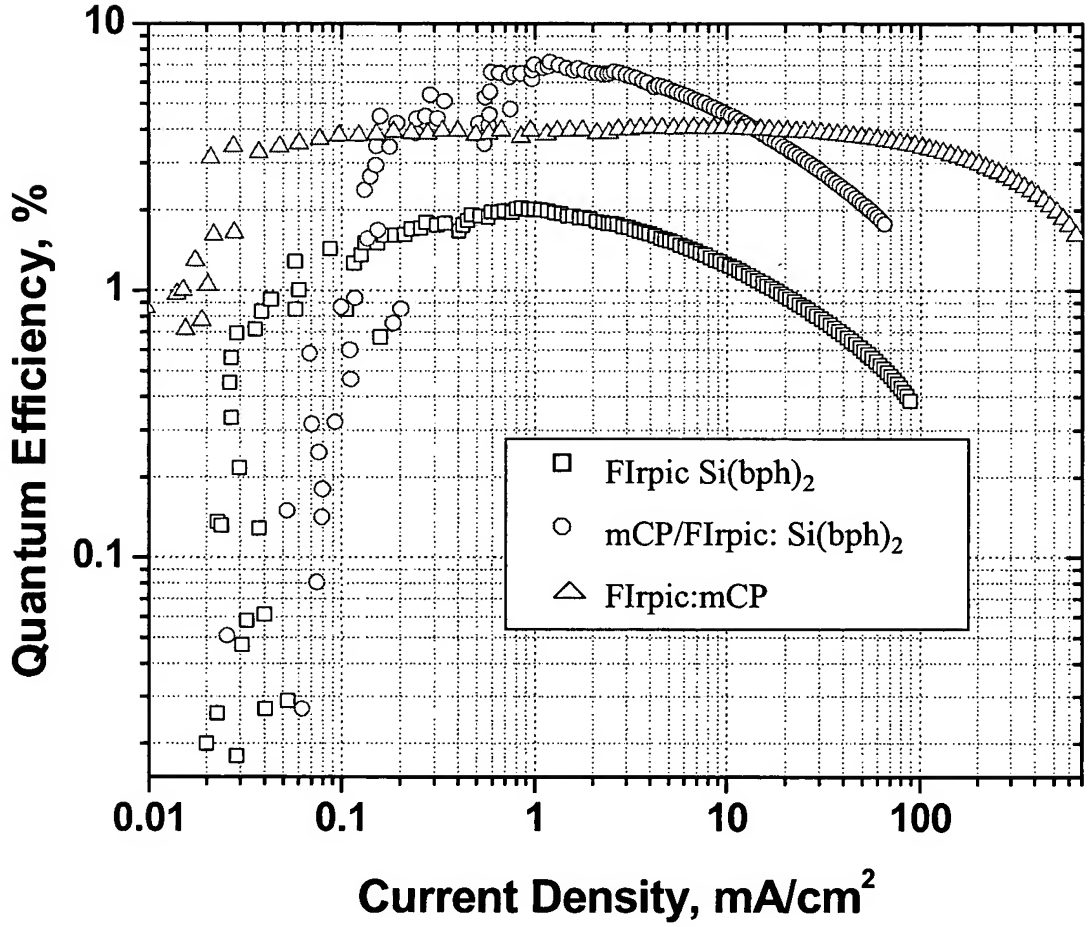


Figure 23

Devices:
ITO/NPD(400Å)/mCP/ FIrpic:Si(bph)$_2$(300Å)/Alq(250Å)/LiF/Al
ITO/NPD(400Å)/FIrpic:mCP(300Å)/Alq(250Å)/LiF/Al

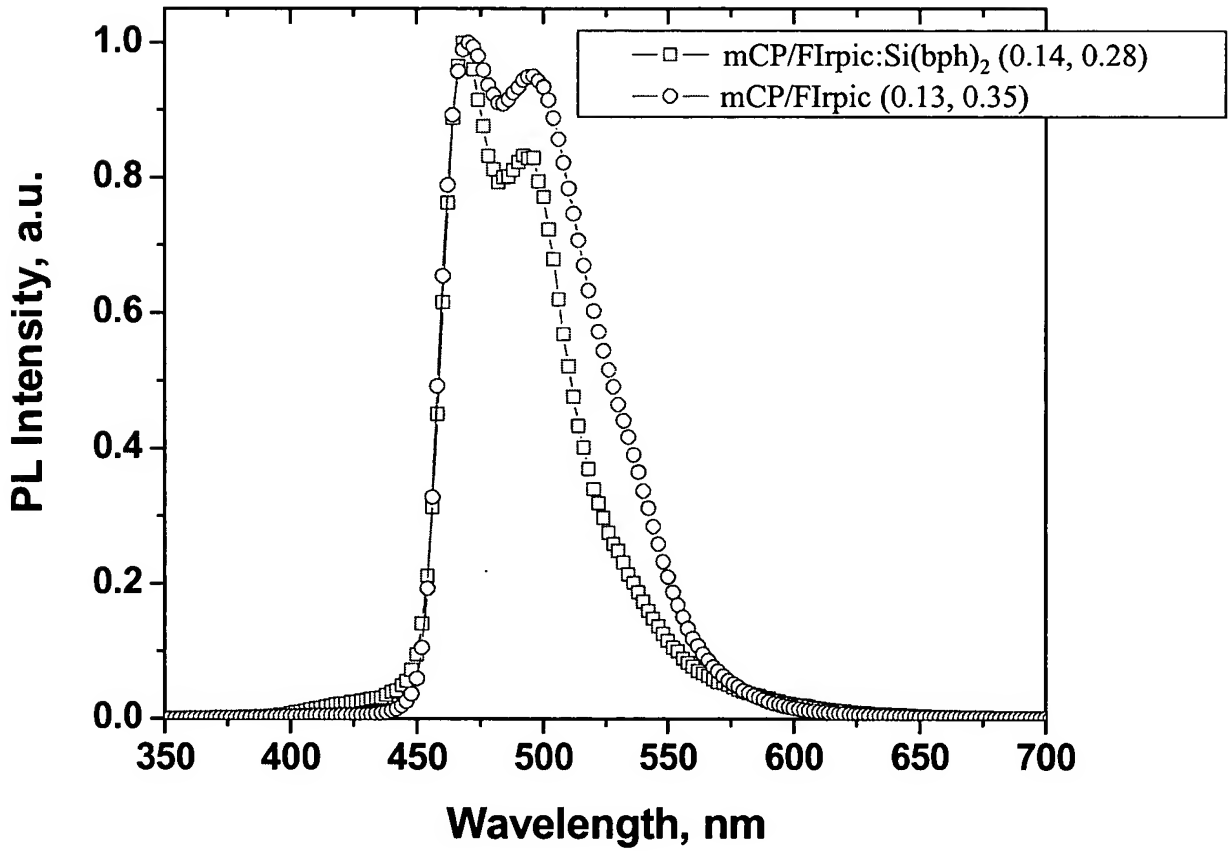


Figure 24

Abs/Em 9,9-Spirobissilaantharcene

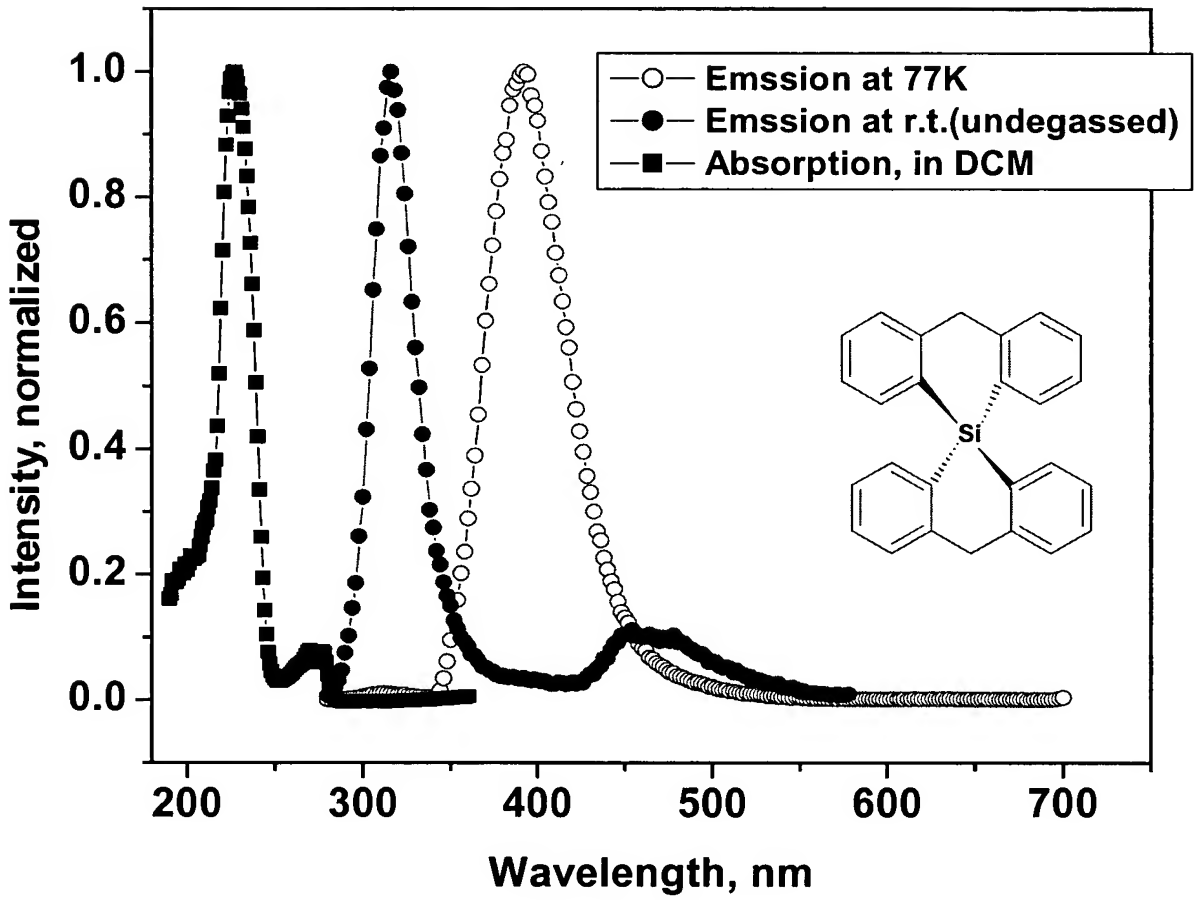


Figure 25

OctaPhenyl-Polyhedral Oligomeric SilSesquioxane

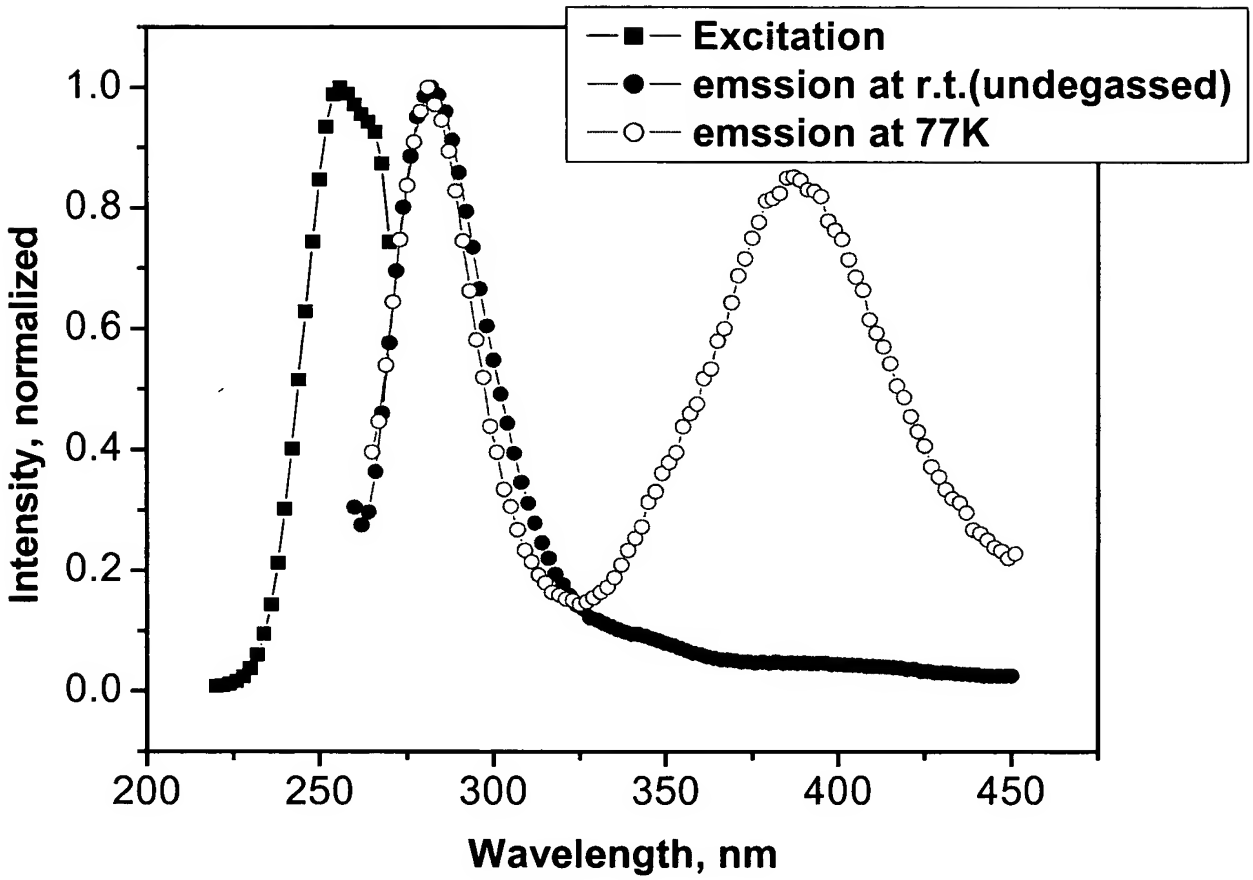


Figure 26

ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz_4):$Siph_2$(o-tolyl)$_2$(10%, 250Å)/
BCP(400Å)/LiF/Al

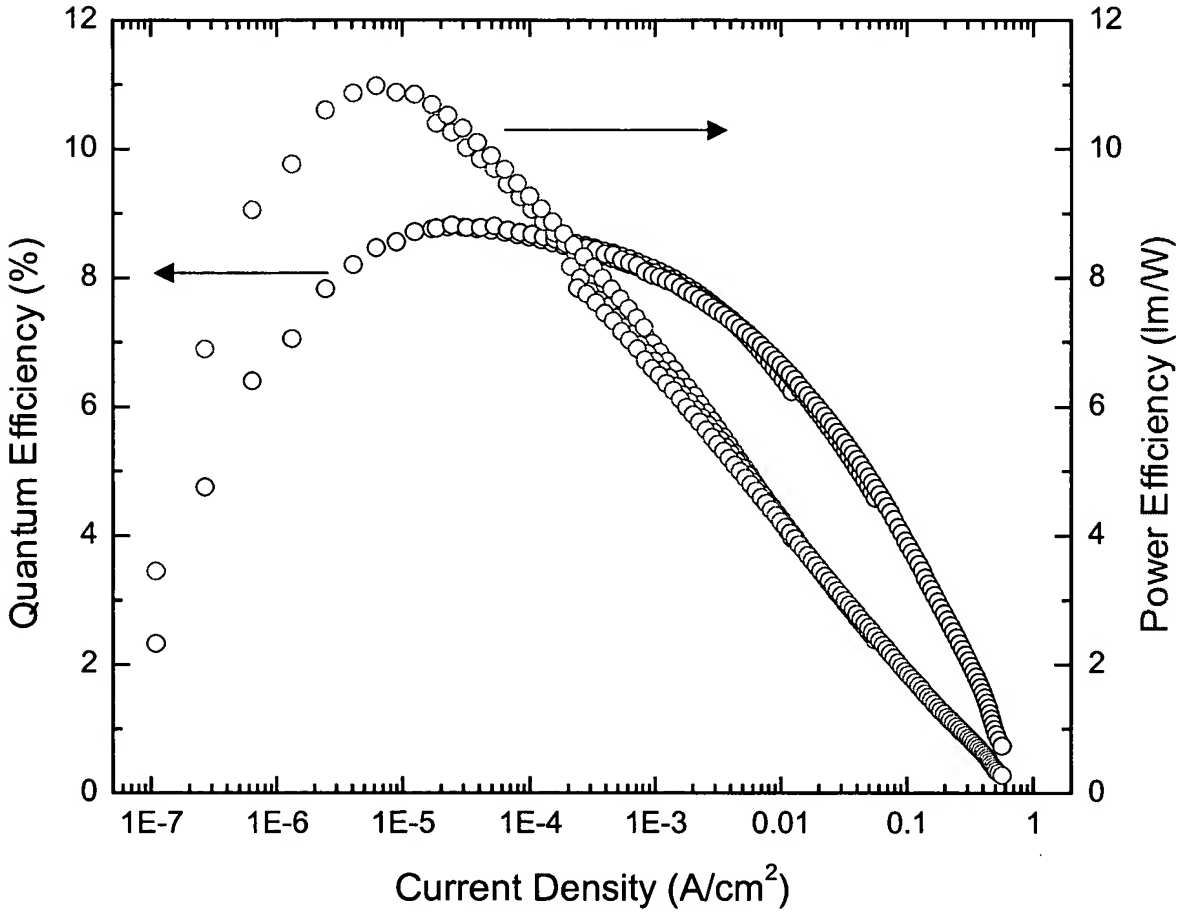


Figure 27

ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz$_4$):Siph$_2$(o-tolyl)$_2$(10%, 250Å)/ BCP(400Å)/LiF/Al

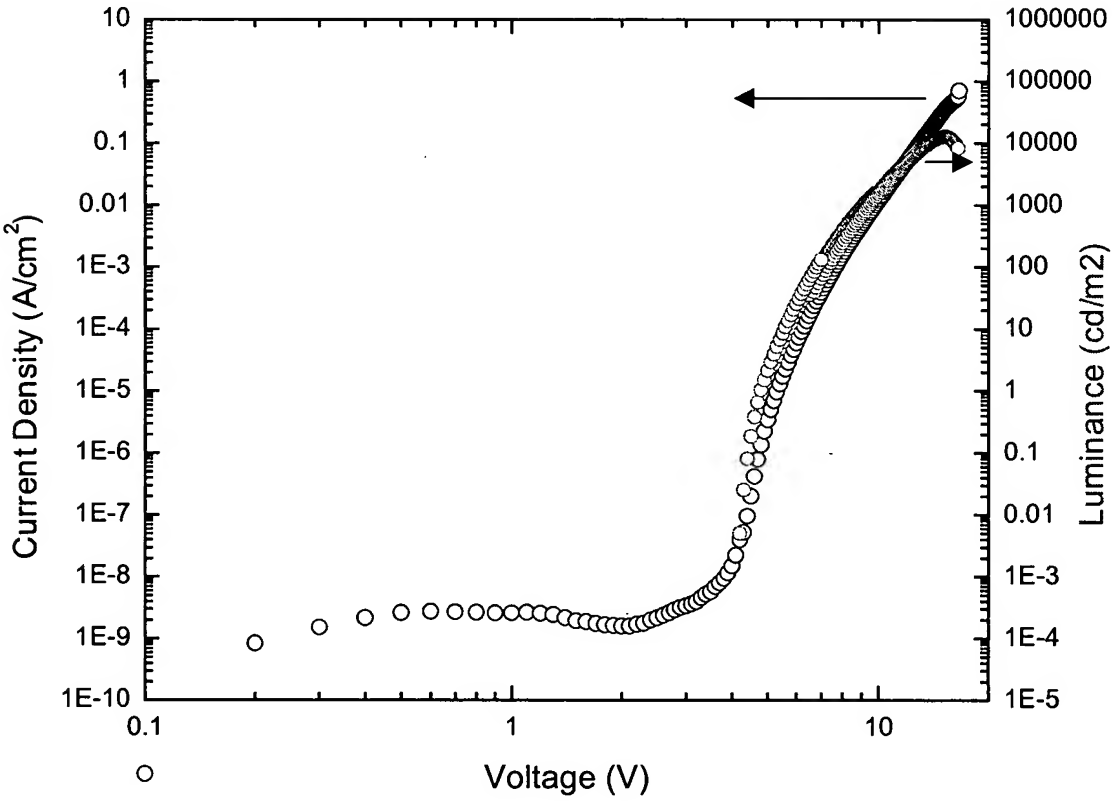


Figure 28

ITO/NPD(400Å)/mCP(100Å)/Ir(4,6-F_2ppy)$_2$(BPz$_4$):Siph$_2$(o-tolyl)$_2$(10%, 250Å)/ BCP(400Å)/LiF/Al

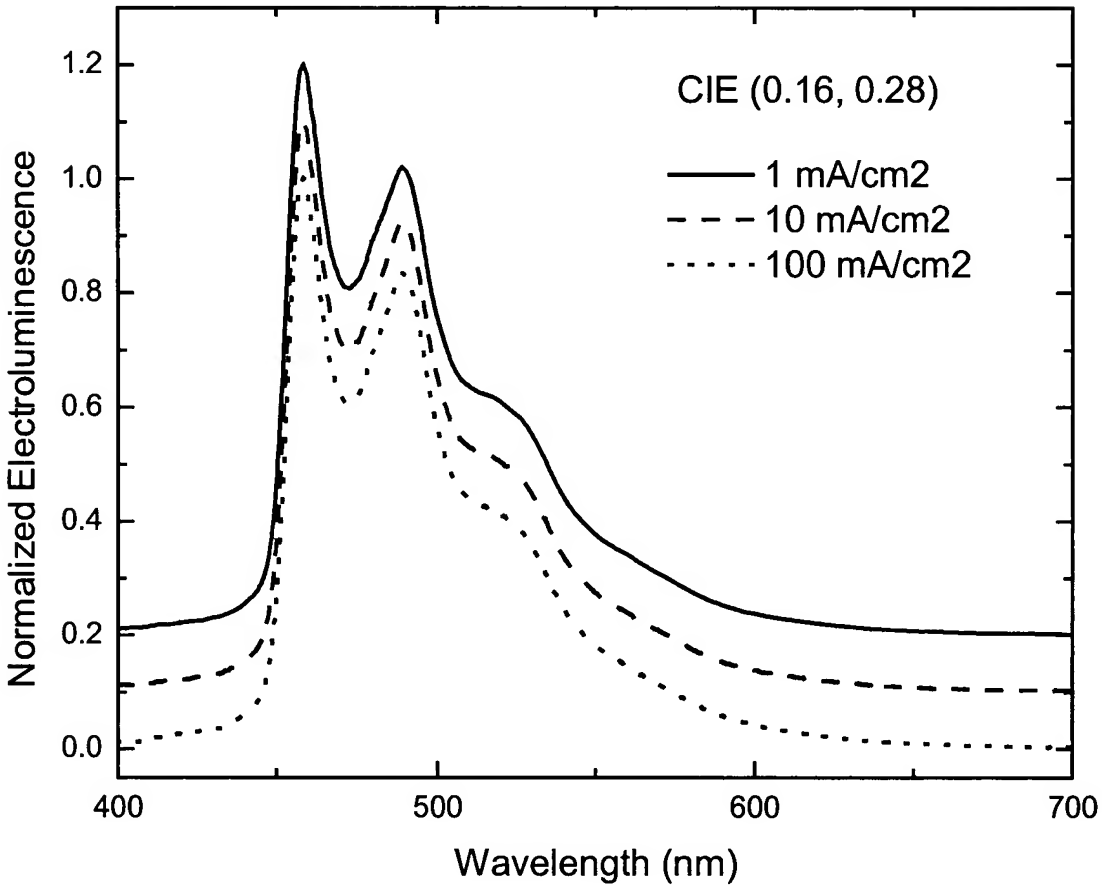
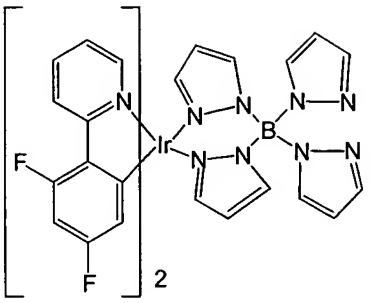
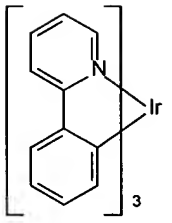


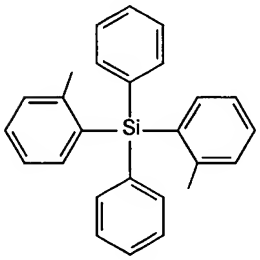
Figure 29



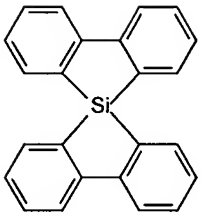
$Ir(4,6\text{-}F_2ppy)_2(BPz_4)$



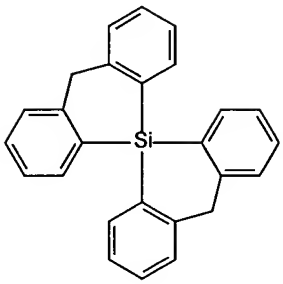
Irppy



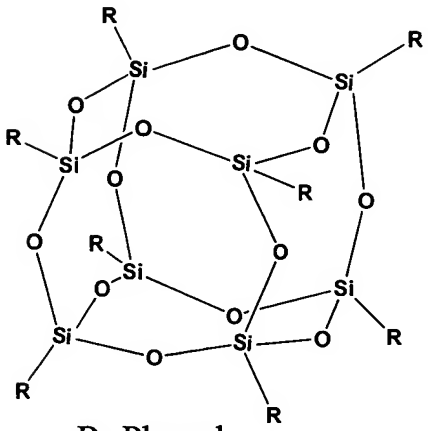
$Siph_2(o\text{-}tolyl)_2$



5,5'-Spirobi(dibenzosilole)

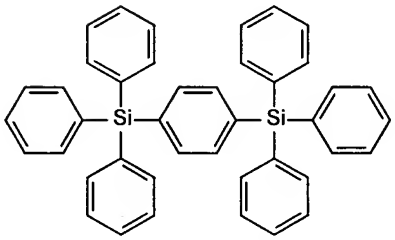


9,9-spirobissilaanthracene



R: Phenyl

octaphenyl-polyhedral oligomeric silsesquioxane



$p\text{-}(SiPh_3)_2Ph$

Figure 30

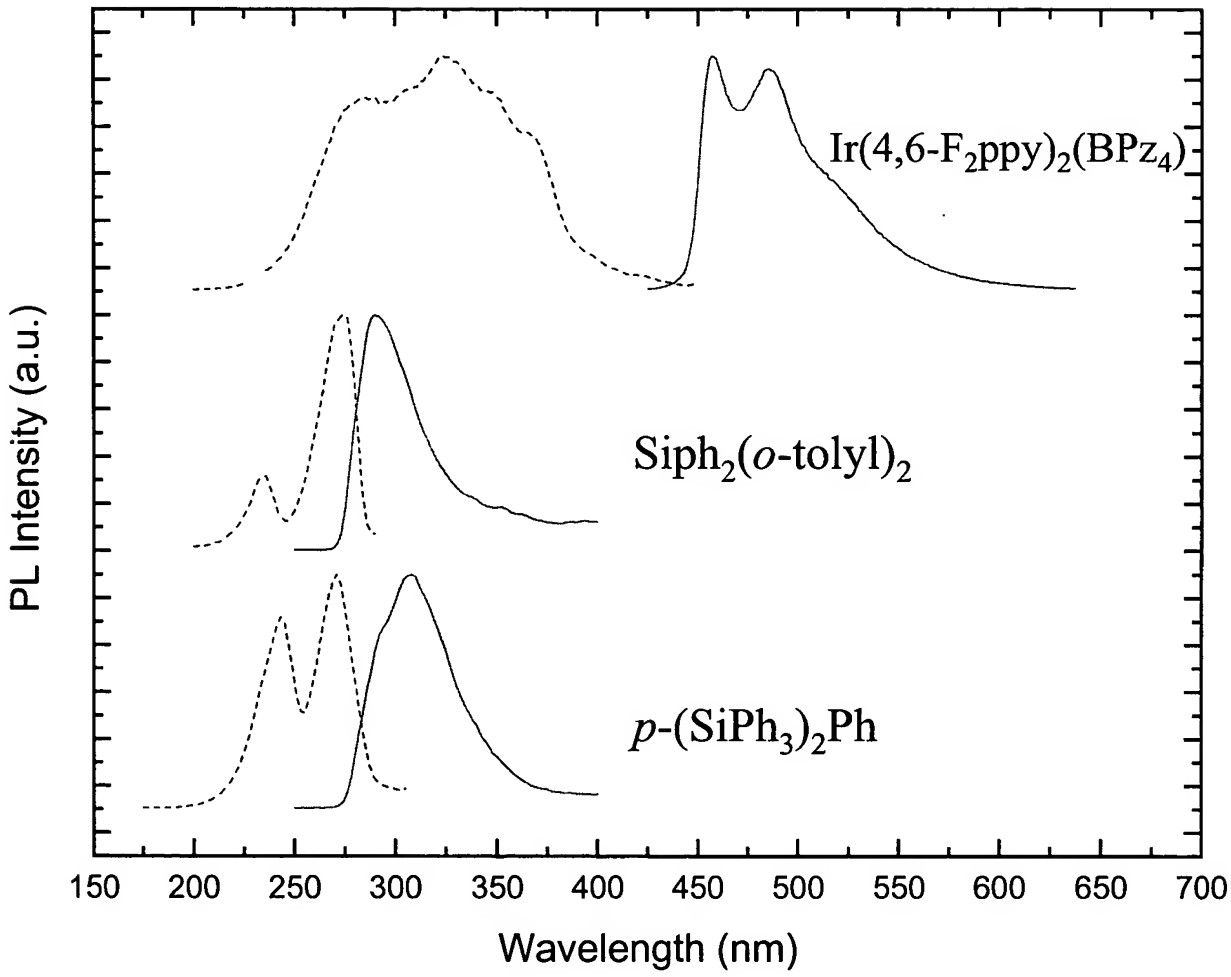

PL Intensity (a.u.)
Ir(4,6-F2ppy)2(BPz4)
Siph2(o-tolyl)2
p-(SiPh3)2Ph
150
200
250
300
350
400
450
500
550
600
650
700
Wavelength (nm)

Figure 31

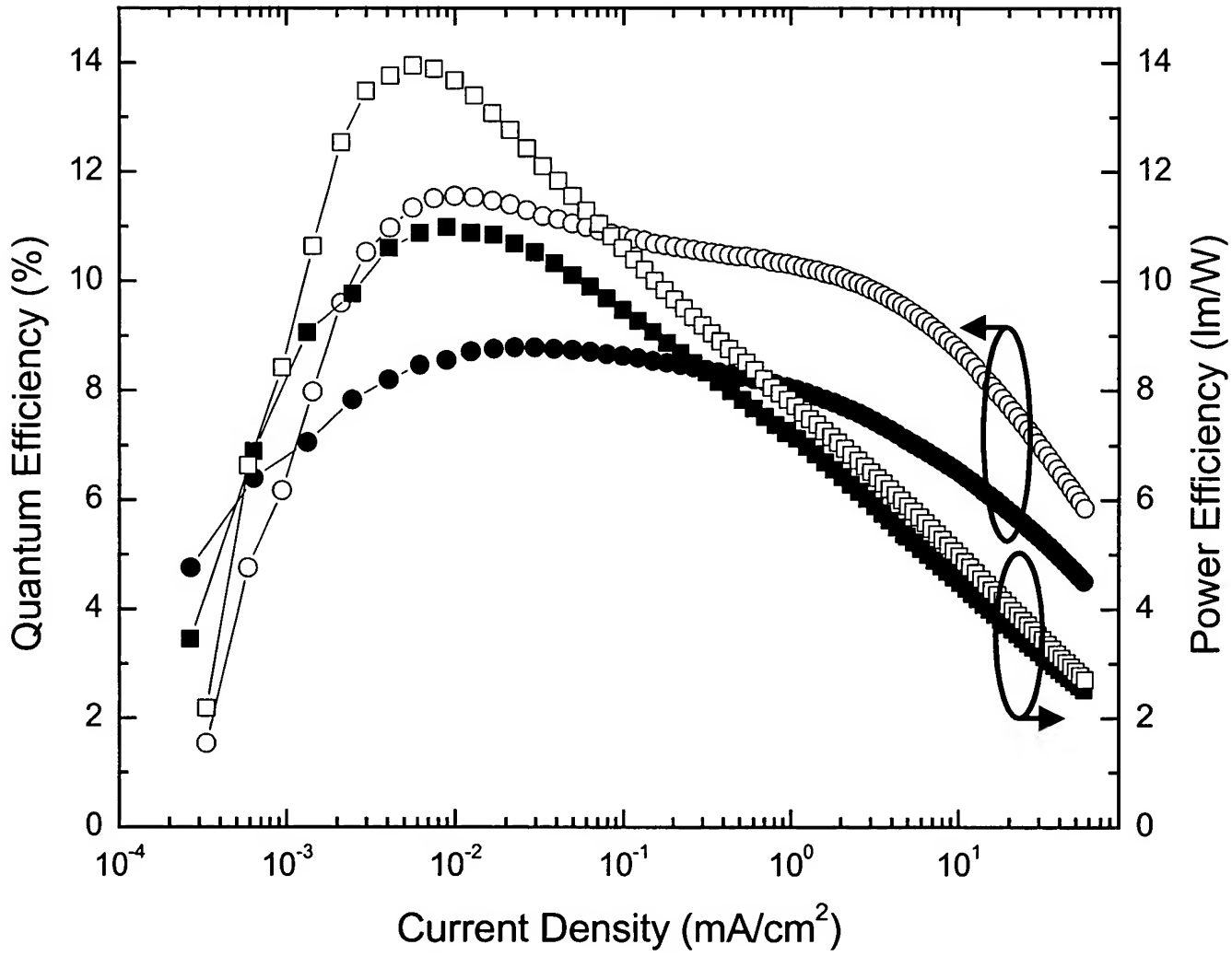

Quantum Efficiency (%)
Power Efficiency (lm/W)
Current Density (mA/cm^2)
0
2
4
6
8
10
12
14
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}

Figure 32

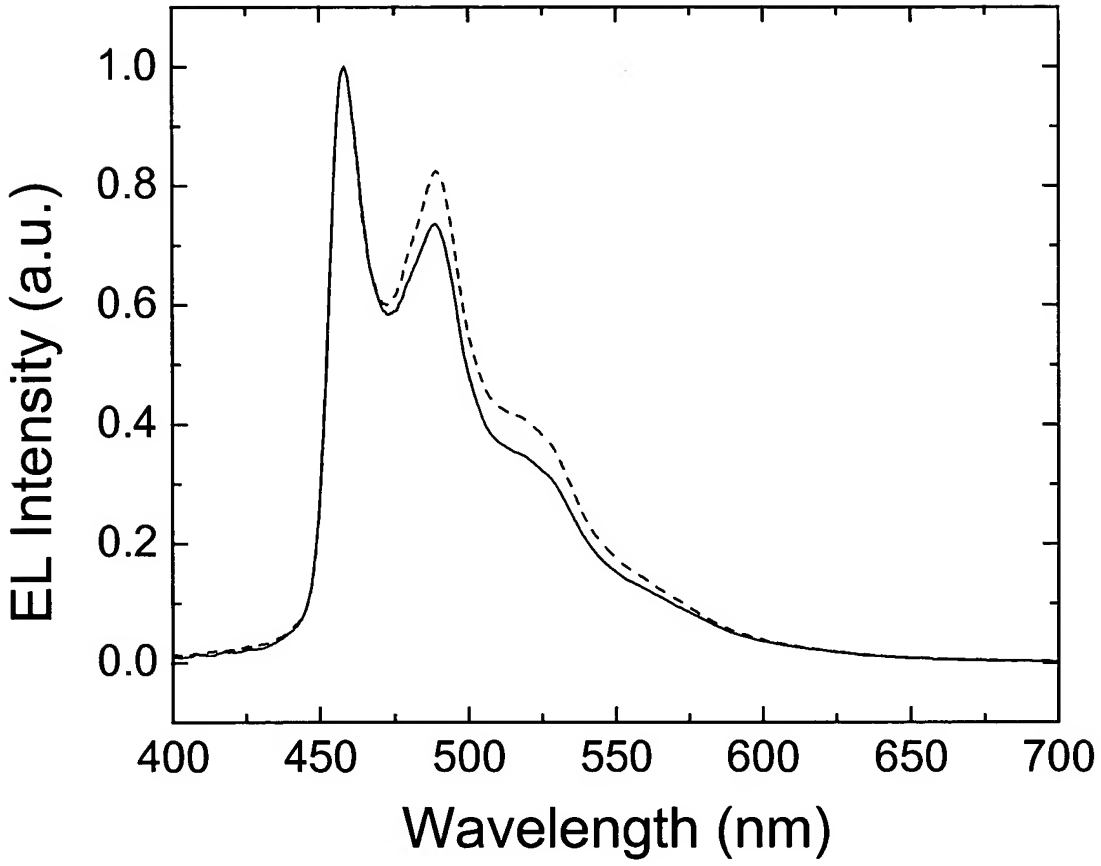

EL Intensity (a.u.)
1.0
0.8
0.6
0.4
0.2
0.0
400
450
500
550
600
650
700
Wavelength (nm)

Figure 33

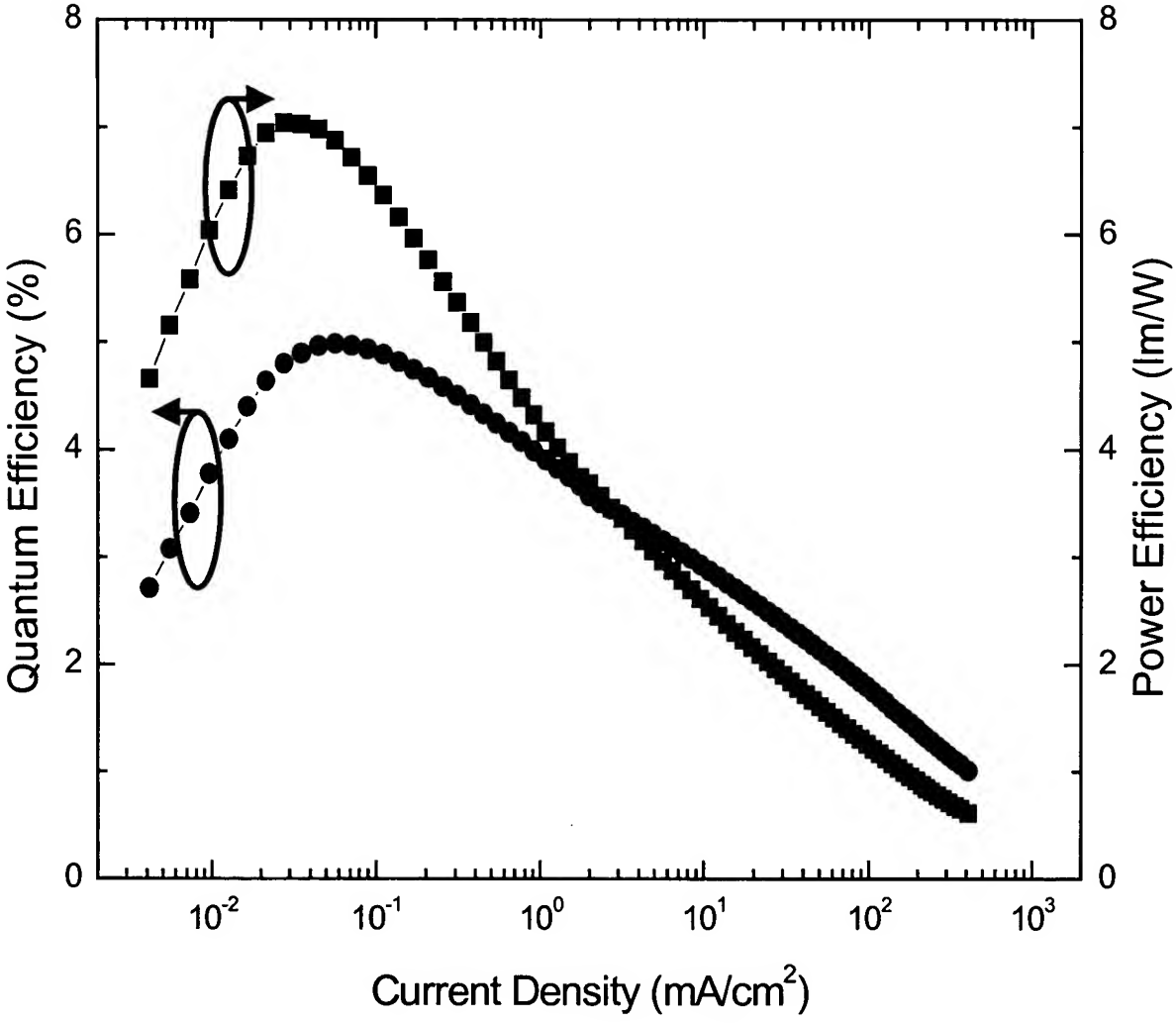

Quantum Efficiency (%)
Power Efficiency (lm/W)
Current Density (mA/cm^2)
0
2
4
6
8
10^{-2}
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}

Figure 34

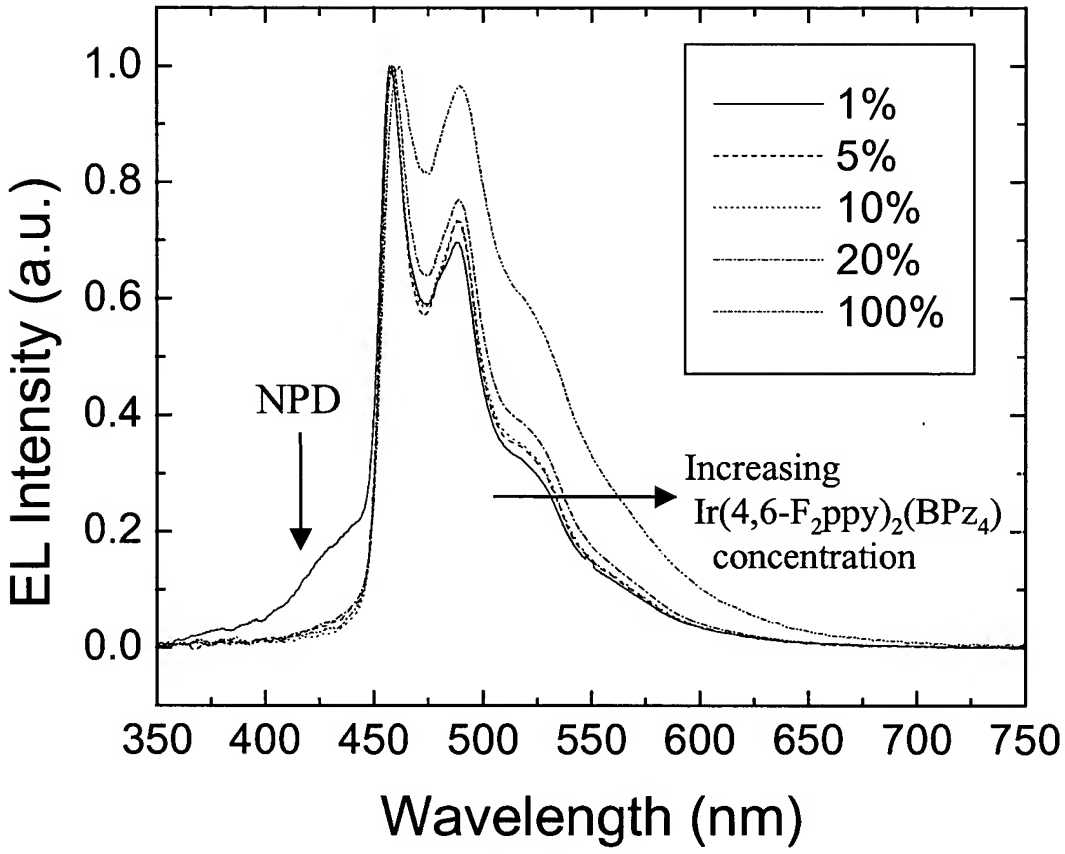

EL Intensity (a.u.)
1.0
0.8
0.6
0.4
0.2
0.0
350
400
450
500
550
600
650
700
750
Wavelength (nm)
1%
5%
10%
20%
100%
NPD
Increasing
Ir(4,6-F2ppy)2(BPz4)
concentration

Figure 35

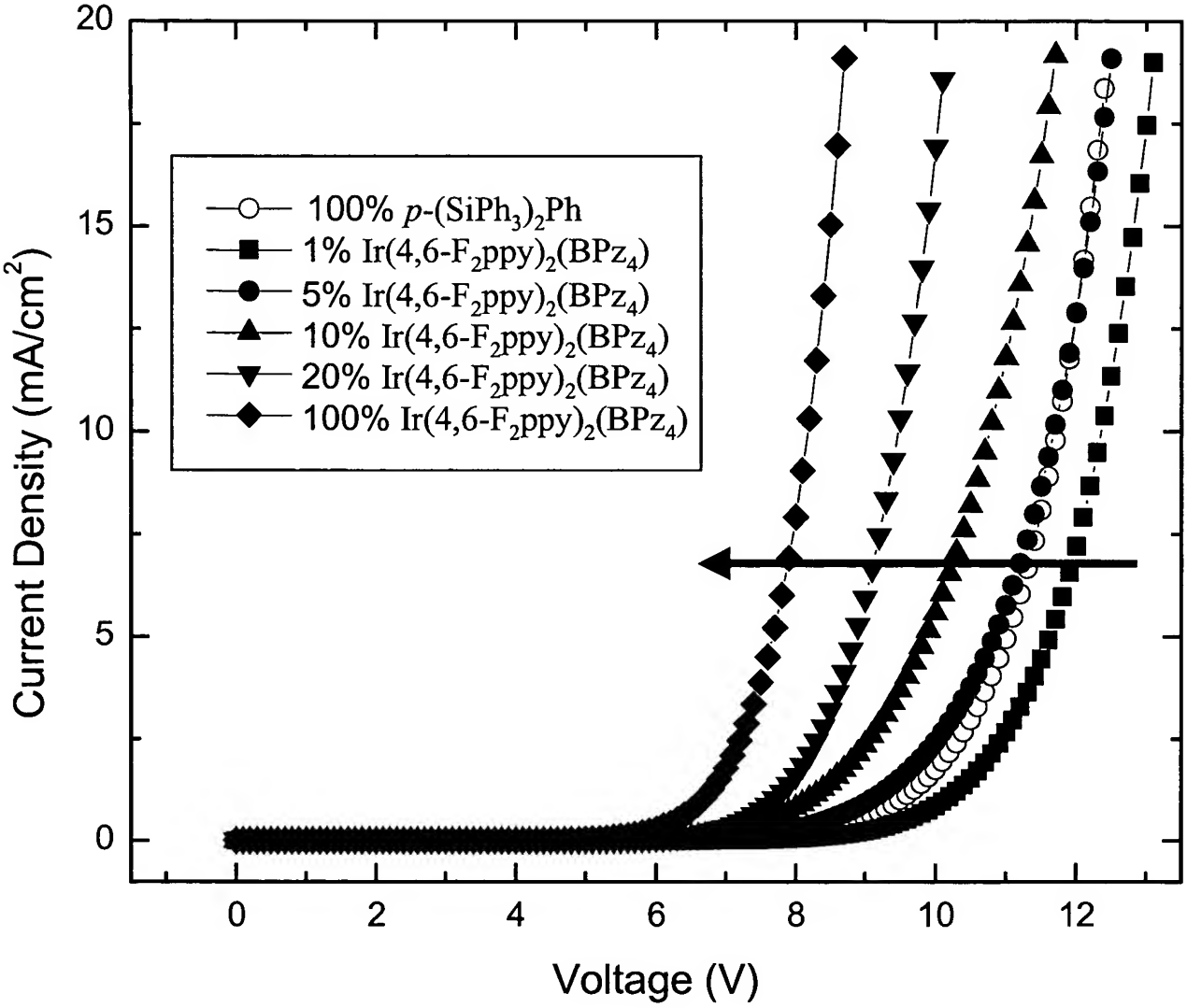
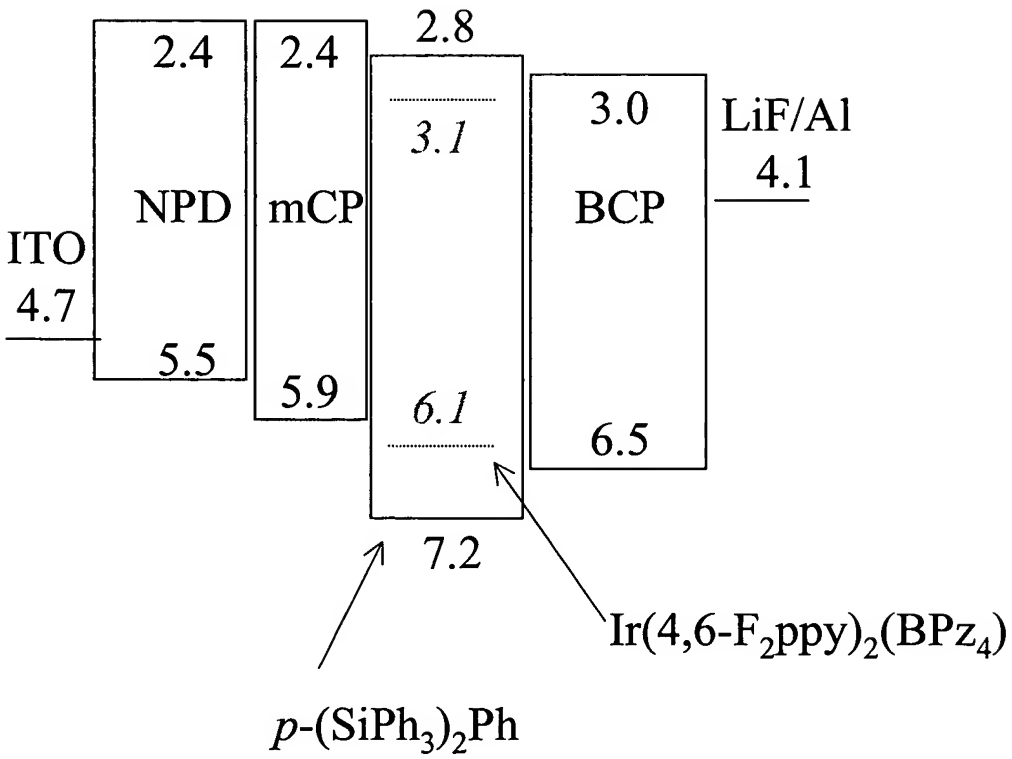

Current Density (mA/cm^2)
Voltage (V)
0
5
10
15
20
0
2
4
6
8
10
12
100% p-(SiPh$_3$)$_2$Ph
1% Ir(4,6-F$_2$ppy)$_2$(BPz$_4$)
5% Ir(4,6-F$_2$ppy)$_2$(BPz$_4$)
10% Ir(4,6-F$_2$ppy)$_2$(BPz$_4$)
20% Ir(4,6-F$_2$ppy)$_2$(BPz$_4$)
100% Ir(4,6-F$_2$ppy)$_2$(BPz$_4$)

Figure 36


2.4
2.4
2.8
3.1
3.0
LiF/Al
4.1
NPD
mCP
BCP
ITO
4.7
5.5
5.9
6.1
6.5
7.2
Ir(4,6-F2ppy)2(BPz4)
p-(SiPh3)2Ph